ELECTRICAL TIMES

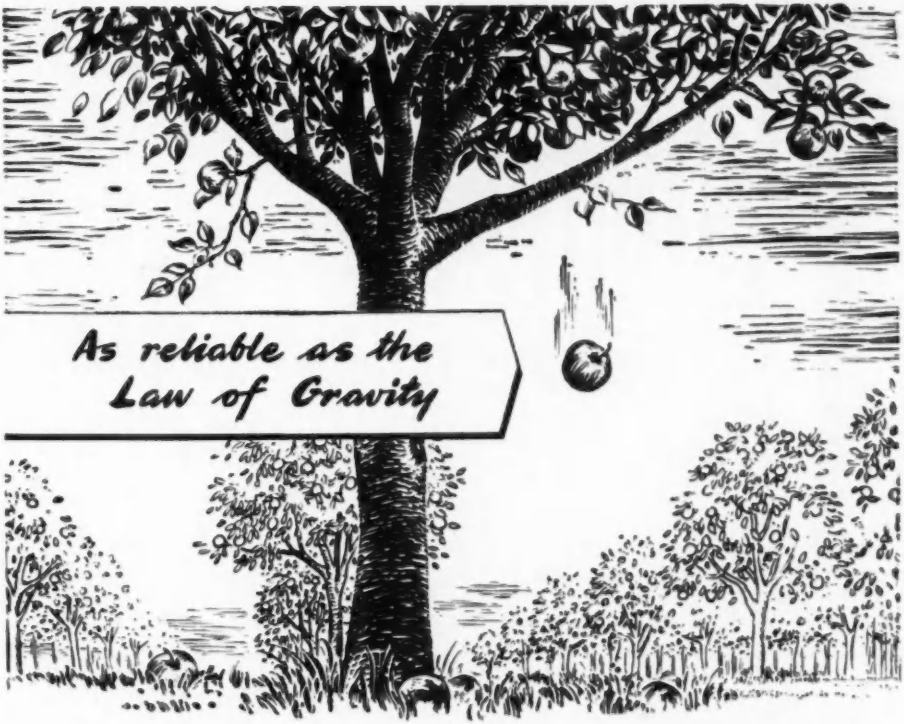
THURSDAY
25 MAY
1950
SIXPENCE

FERRANTI
Ferranti Instruments, Meters, Transformers and Power Factor Correction Condensers installed in a Sub-station of an Engineering Works
FERRANTI
FERRANTI LTD., Hollinwood, LANCS.
London Office: Kern House, Kingsway, W.C.2
FG97a

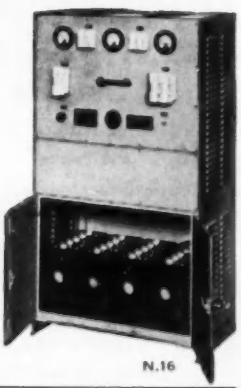
Crompton

HOUSE SERVICE METERS

CROMPTON PARKINSON LIMITED, (PLANT DIV.)
CROMPTON HOUSE ALDWYCH, LONDON, W.C.2.



CHEMICALLY, physically and electrically, **Nife-Neverfayle emergency lighting equipment** is completely dependable. Chemically, because a NIFE battery does not deteriorate during long periods of idleness—the electrolyte is almost inert. Physically, because a NIFE battery is made principally of steel. Electrically, because a NIFE battery even after months of inactivity will give its full voltage the moment the automatic switch operates. For these reasons, and because so very little maintenance is required, hospitals and cinemas all over the world are using Nife-Neverfayle as their protection against lighting failures.



NIFE-NEVERFAYLE

THE EMERGENCY LIGHTING EQUIPMENT

with the STEEL battery

NIFE BATTERIES · REDDITCH · WORCESTERSHIRE

A

WOOTTON
METER BOARDS
AND SWITCH BLOCKS

We have been making and supplying the Electrical Industry with METER BOARDS and Switch Blocks for over 27 years

- *FIRST CLASS WORK*
- *QUICK DELIVERIES*
- *COMPETITIVE PRICES*

We invite your enquiries

WOOTTON & CO., LTD.
ALMA WORKS, PONDERS END, MIDDX.
TELEPHONE: HOWARD 1858
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VULCANISED FIBRE, BAKELITE,

EBONITE and PRESSPAHN
Sheets, Rods, Tubes

LEATHEROID Sheets, Rolls, etc. Insulating Tapes and Staples, Jointings. Fabricated parts—exceptionally keen prices.

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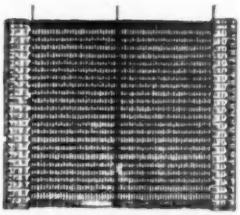
Phone: CLERKENWELL 4731 (P.B.E.)
Established 1865

ASBESTOS WOVEN
WIRE RESISTANCE NETS

Speedily supplied from stock, or 'made to measure' at a cost that will please you. Our Technical Service will help you with any problems.



CRESSALL

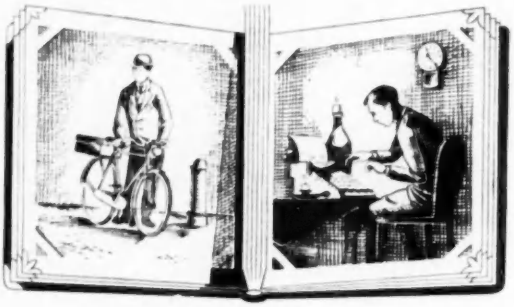
Registered Trade Name of—
The CRESSALL MANUFACTURING CO., LTD.
Tower Street, Birmingham 19
Telephone: ASTon Cross 2666 (3 lines). Telegrams: OMHIC, BIRMINGHAM

The New G.E.C. PLASTIC PREHEATER

- Greatly reduced maintenance costs
- 2 kW. High Frequency output
- Several pounds of material can be preheated at each charging—at approx. 1½ lbs. min.
- Operating controls reduced to minimum
- Full information is in Publication No. P.H. 1130.

THE GENERAL ELECTRIC CO. LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2

1912



1950

The Story of BELLING *& Company Ltd.* No. 5

Unfortunately I can't remember and cannot trace who our first customer was, but I should think it lay between the Westminster Electric, The Barnes, The Marylebone Electric. However, in those days there were a number of ".5'ers" who were all on the lookout for appliances to consume electricity. Our fires absolutely "filled the bill," taking as they did 3 kws. when full on. The fire was strong, simple, practical and very effective and any engineer could see there was very little to go wrong.

I called on most ".5'ers," started advertising in the trade papers and in a very short time orders came rolling in. These took us over the winter of 1912/13.

Up to now we were still carrying on at "The Hop Poles" Garage, Enfield, my day consisting of morning in the works, afternoon out travelling, evening at home typing invoices and letters. Also I wrote all our adverts, and perhaps I might add I was doing all this personally, having no office staff at all. I used to sleep on Sunday afternoons!!

During the spring of 1913 orders still kept coming in well, and we had to look for larger premises which we were fortunate in finding at Derby Road, Edmonton. We were able to commence moving over during summer of 1913.

For the winter season, 1913/14, I got out a new catalogue, fires only this time—as these kept us so busy we had to drop, for the time being, the other appliances shown in our first catalogue. We had a dozen designs, including our "Standard," "Office," "Portable," and some nice ones in sheet metal, which we had made for us in Birmingham.

We had a good season and in 1914 produced our first balance sheet. This showed we had sold about £11,000 of fires and made a profit of about £3,500. This we allocated between us, according to our arrangements and we each of us left the money in the business. I see from the trading account our advertising and posters for the first year came to £390. This was more than my wages and the foreman's put together!! Travelling expenses were £49 for the year, so I must have used my bike quite a lot. Applications for patents came to £47 so I must have had a crowd of ideas at £3 per provisional! However, I've always been keen on advertising and patents—must have taken out hundreds of the latter during my life—and still doing it!

During the summer of 1914 rumours of war were already about, but Lloyd George's message to the nation was "Business as usual," so we carried on steadily, building reasonable stocks. For winter 1914 I produced a bolder catalogue with coloured frontpiece and listing about 24 designs.

War started in August but we were able to sell most of our stock and we commenced doing war work for the Admiralty. Our balance sheet for March 1915 showed a considerably increased turnover and a good profit, which was ploughed back again as before.

At our Annual Meeting the question of the general position of our venture arose. Mr. Arnold had joined the army, Mr. How had become absorbed in his various Hotels and as the future of our partnership seemed uncertain I undertook to try to buy my two partners out. From that date I became sole proprietor of the business.

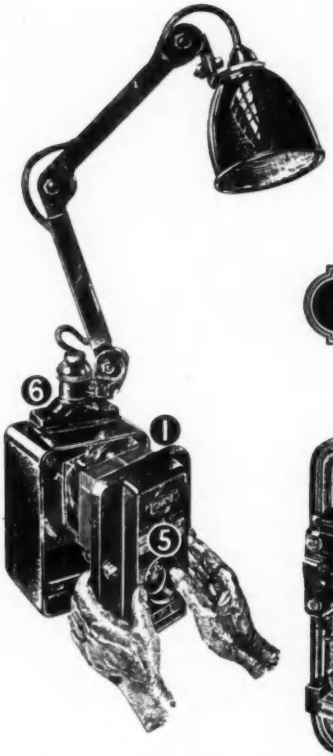
The next chapter deals with the war years and how we progressed.

C. A. Belling

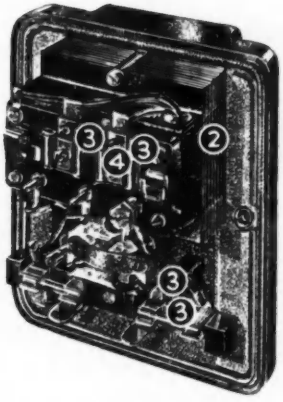
"LŌ-VŌ-LITE" SELF-ISOLATING TYPE LOW VOLTAGE LOCALISED LIGHTING

FOR SAFETY AND SAVING IN FACTORY AND WORKSHOP

DELIVERY FROM STOCK



ELECTRIC IGRANIC CO. LTD



1. COMPLETELY SELF-ISOLATING TRANSFORMER
2. VACUUM IMPREGNATED TRANSFORMER GIVING HIGH PRIMARY TO SECONDARY INSULATION
3. DOUBLE POLE FUSES (AND SPARES) FOR BOTH WINDINGS
4. SECONDARY FUSE HOLDER OF LOW RESISTANCE CONTACTS ENSURING LOW VOLTAGE DROP ON SECONDARY
5. RECESSED SWITCH PREVENTS SHOP BREAKAGES
6. UNIVERSAL BASE FOR EITHER MACHINE, BENCH OR TRANSFORMER MOUNTING

(ASK FOR PUBLICATION 68610)

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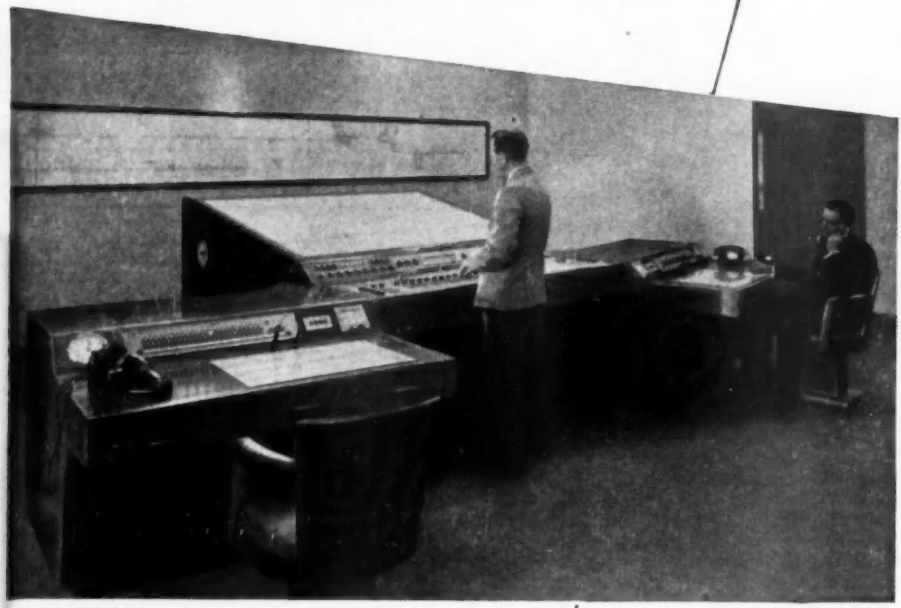
EXPORT DEPT.: *VICTORIA STATION HOUSE, 191 VICTORIA STREET, LONDON, S.W.1*
CABLEGRAMS - - - - - - - - - "IGRANIC LONDON"

TUDOR AGAIN



Interior of Hall Road control room showing control desk in use

Photograph by courtesy of British Railways

LIVERPOOL-SOUTHPORT ELECTRIC RAILWAY MODERNISATION SCHEME

In this modernisation scheme, just completed, it's Tudor all along the line. Current is purchased in bulk from the BEA Clarence Dock Power Station, a duplicate 33 k.V. supply being available. In this power station two 100-cell Tudor Batteries are installed, each with a capacity of 720 ampere-hours. In the British Railways distribution substations, no less than 29 Tudor Batteries are in operation, complete with rectifier charging equipment. For switch operating, emergency lighting and telephone supervisory control equipment—for all these purposes—Tudor again plays a vital part. Where the really big jobs are concerned, experience points to Tudor Batteries as the obvious choice.

Tudor

BATTERIES

T 103A

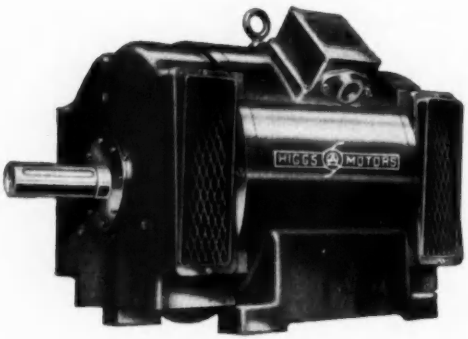
THE TUDOR ACCUMULATOR CO LTD 50 GROSVENOR GARDENS • LONDON • SW1

CABLES AND COMETS

The DE HAVILLAND COMET — an epoch making production and as such demanding the finest fittings and accessories obtainable. For this reason the Comet is fitted throughout with C.M.A. cables, the last word in scientific cable construction.

MAINS CABLE MANUFACTURERS ASSOCIATION
RUBBER & THERMOPLASTIC CABLE MANUFACTURERS ASSOCIATION
Affiliated to
CABLE MAKERS ASSOCIATION
52-54 High Holborn, London. W.C.1. Tel: Holborn 7633

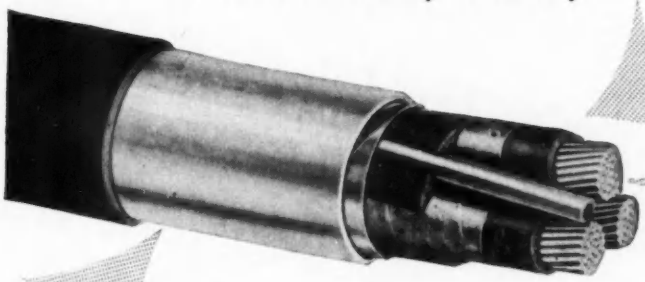
HIGGS MOTORS
TRADE MARK
CHAIRMAN WALTER F. HIGGS, M.I.E.E. LTD.
BIRMINGHAM 6 ENGLAND



Sturdy cast-iron stator frame.
Screen protected enclosure with maximum accessibility.
Substantial shaft, deep-groove ball bearings,
accessible terminals,
AND
GUARANTEED FOR EVER

Belfast, Birmingham, Bristol, Dundee, Glasgow, London,
Manchester, Newcastle, Peterborough, Sheffield, Wolverhampton

THIS IS NEWS of yet another advance in Electric Power Transmission. BICC have developed and are making 33,000 volt Aluminium Sheathed Impregnated Pressure Cables, and installations are being carried out for the Area Boards of the British Electricity Authority.



The use of aluminium as a sheath makes the cable lighter, stronger and more economical than conventional types. This is another example of the way in which BICC engineers are searching for and perfecting new ways in high voltage transmission.

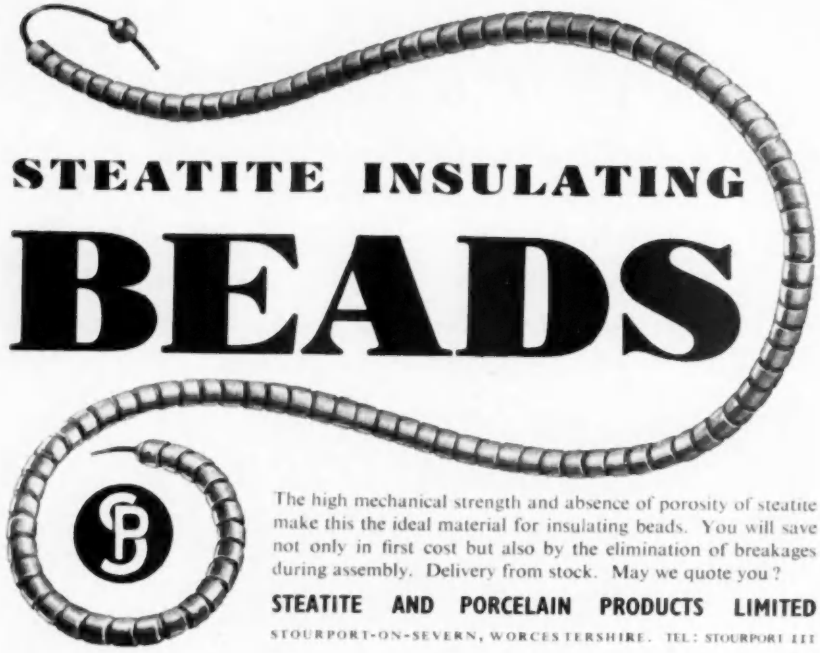
B.I. Callender's

Aluminium Sheathed

IMPREGNATED PRESSURE

Cable

BRITISH INSULATED CALLENDER'S CABLES LIMITED
NORFOLK HOUSE, NORFOLK STREET, LONDON, W.C.2



STEATITE INSULATING BEADS

The high mechanical strength and absence of porosity of steatite make this the ideal material for insulating beads. You will save not only in first cost but also by the elimination of breakages during assembly. Delivery from stock. May we quote you?

STEATITE AND PORCELAIN PRODUCTS LIMITED

STOURPORT-ON-SEVERN, WORCESTERSHIRE. TEL: STOURPORT 111

S.P.70

The New DS 15 Amp.

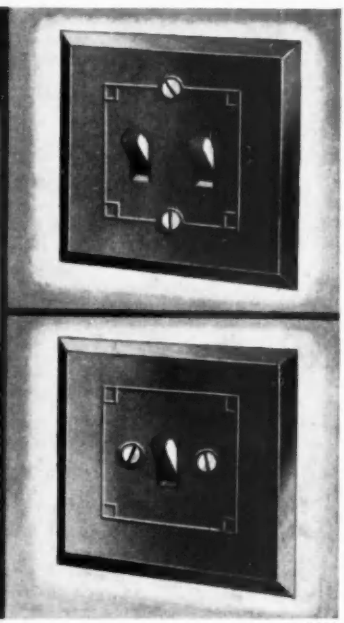
CUMBRIAN SWITCH

HERE is a 15-amp switch at a 5-amp price. Single or double switches are designed to fit a standard B.S. 1299 box, and switches are of the one-way or two-way pattern.

The switches are mounted in the box on slotted mounting brackets which allow for perfect alignment of switch, even when box is installed out of square.

The assembly is complete with strong front plate and may be had in brown or white non-track plastic.

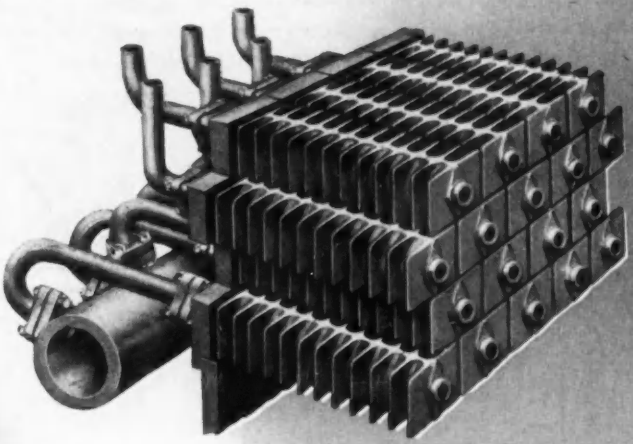
Write for List CE 2.



D.S. PLUGS LTD
MANCHESTER · 5

ETIM50

ALL THE ADVANTAGES



Green's Premier Diamond Economiser (Type 12) illustrated here is specially designed for high pressures.

PREMIER DIAMOND

GREEN'S economisers

E. GREEN & SON LTD., WAKEFIELD

Makers of economisers for one hundred years

G.E.56

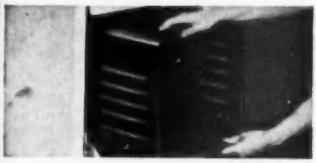
These 12 features explain why the **FALCO Cooker** *is such a favourite . . .*

FIRST impressions are important—and this electric cooker delights the housewife at once with its good-to-look-at, easy-to-clean design. When she learns all the Falco can *do*, she is even more enthusiastic, for its self-controlled heat means the end to so much fuss and bother. The Falco has *every* virtue a modern electric cooker can possess :

This is the **Falco No. 16** with 3 cooking plates and a utility drawer at the bottom for cooking utensils . . . **Falco No. 15** is the same but has 2 cooking plates . . . **Falco No. 17** is the same but has 2 cooking plates and no utility drawer.

1 Self-indicating switch handles.

2 Quickly dismantled for cleaning.



3 Round-cornered, removable oven — unscrew a nut and out it comes bottom, sides and top for easy cleaning.
4 Clean-line design.
5 Cream, cream and green, white *or* light grey mottled vitreous-enamel finish.
6 Thermostatic oven control.
7 Simmering control on boiling plate of models 15 and 16.
8 E.D.A. interchangeability.
9 Fuses.
10 Plug-in oven elements.
11 Spring controlled drop-down oven door.
12 First class electrical and mechanical construction.

FALCO ELECTRICAL APPLIANCES LIMITED

Note New Address

CORPORATION ROAD, AUDENSHAW, MANCHESTER

Proprietors : ALLIED IRONFOUNDERS LIMITED

New range of motors satisfies dollar area as well as British users

The new range of Crompton Parkinson standard frame motors are made to American standards. That in itself is important news. But the new range goes further. Each frame will be available in two electrical designs. One design has the American rating and can be used on all machines bound for dollar areas. The other is more highly rated for British users.

Here is a workable solution to the problem of a world standard. It has been achieved by the Company whose efforts have been directed towards simplification and standardisation for over 30 years. Buyers all over the world will welcome this new development. It will help every British manufacturer of power driven equipment increase his sales in dollar areas. *These new designs are additional to the Crompton Parkinson existing comprehensive range.*

Crompton Parkinson LIMITED

CROMPTON HOUSE, ALDWYCH, LONDON, W.C.2

REGD. TRADE MARK
NIPHAN

WEATHERPROOF METAL-CLAD PLUGS, SOCKETS SWITCH PLUGS, ETC. for all electrical purposes

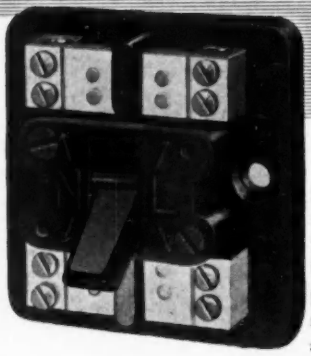
5/300 amp.
250/500 volt.

Latest Catalogue on Application.

SIMMONDS & STOKES LIMITED
MANUFACTURING ELECTRICAL ENGINEERS
Victoria House, Southampton Row, London, W.C.1 · Holborn 8637 and 2163

OVERSEAS AGENTS: *S. AFRICA, Hubert Davies & Co., Ltd., Johannesburg. NEW ZEALAND, Samuel Brown, Ltd., Wellington. INDIA, G.E.C. (India) Ltd., Calcutta. CEYLON, Walker & Greig, Ltd., Colombo*

THE SWITCH WITH TOTALLY ENCLOSED CONTACTS



TOTALLY ENCLOSED CONTACTS prevent dirt and foreign matter causing failure to make circuit. Clear ON and OFF Indication; compact size; attractive finish. **Easy Wiring** — allows for front or back entry in the one Switch.

"WYLEX" — the Original Slow-Break Floating Bar Action — still the most up-to-date.

More and more Buyers are specifying "WYLEX" Switch, because of its high safety margin — proved by nearly a million installations; and by severe Lab. Tests (*ask for Report*).

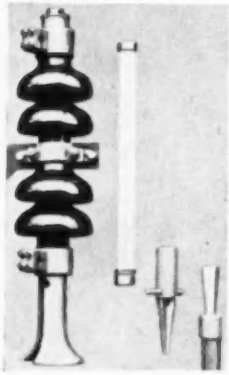
WYLEX 30-AMP DOUBLE POLE SWITCH

Write for leaflet to: GEORGE H. SCHOLES & CO., LTD.
WYLEX WORKS, WYTHENSHAWE, MANCHESTER

'ENGLISH ELECTRIC'

POLE-MOUNTING FUSEGEAR for RURAL DISTRIBUTION

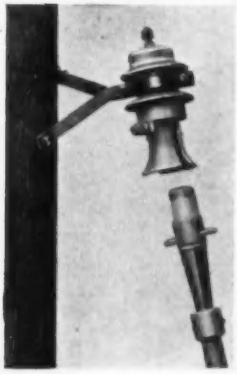
Incorporating ENGLISH ELECTRIC high-rupturing-capacity non-deteriorating cartridge fuse-links



TYPE RD
for 11,000 volts.

TYPE RDJ
for 400/440 volts.

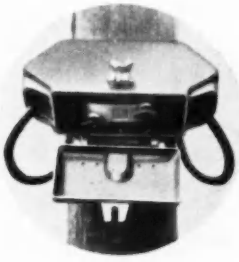
- ★ Cartridge fuse-links totally-enclosed.
- ★ Multiple-coil springs ensure high contact-pressure.
- ★ Suitable for use as isolators.
- ★ Insulators have liberal characteristics.
- ★ Easy to erect.
- ★ Ground operated with sectional light-weight operating pole suitable for both units.
- ★ Tens of Thousands in use.



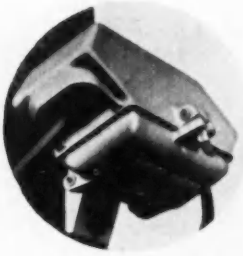
GALVANISED POLE-MOUNTING FUSE BOX

300-amps. 400/440-volts

incorporating



- ★ Type JW3S shrouded fuse carrier with mechanically tightened contacts.
- ★ Type J cartridge fuse-links up to 400-amps — 3½in. centres.
- ★ Self-sealing cable entries.
- ★ Double mechanical clamps on each cable terminal.
- ★ Case freely ventilated to retard condensation — no gaskets used.



Write for full details to:

The ENGLISH ELECTRIC Company Ltd.

FUSEGEAR WORKS — EAST LANCASHIRE ROAD, LIVERPOOL, 10

Works also at STAFFORD : PRESTON : RUGBY : BRADFORD

safe and sound inside

just like an
Enfield
rubber insulated
Cable

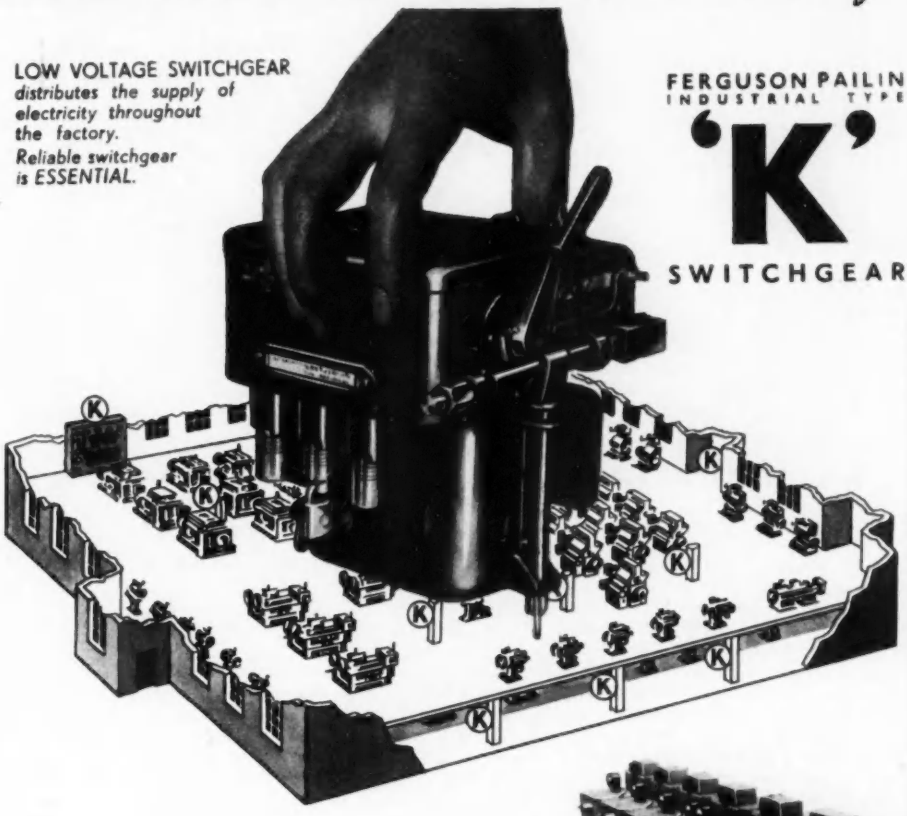
The quality of Enfield C.M.A. cables ensures uninterrupted distribution over many years. We make all types.

ENFIELD CABLES LIMITED
BRIMSDOWN, MIDDLESEX
HOWard 2661 (Works) London Office: HOLborn 0591
BELFAST, BIRMINGHAM, BRIGHTON, BRISTOL, CARDIFF, GLASGOW, HULL, IPSWICH, LEEDS, MANCHESTER, NEWCASTLE, NOTTINGHAM, SELBY, SOUTHAMPTON and throughout the world.

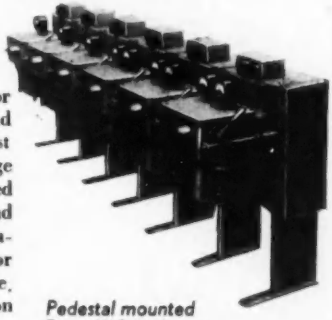
ELECTRICITY SUPPLY *within the Factory*

LOW VOLTAGE SWITCHGEAR
distributes the supply of electricity throughout the factory.
Reliable switchgear is ESSENTIAL.

FERGUSON PAILIN
INDUSTRIAL TYPE
'K'
SWITCHGEAR



The provision of an adequate and reliable supply of power for plant operation and lighting in new factories, or extensions and modifications to existing plant arrangements should be a first consideration. In addition to their well-known high voltage designs, 'Ferguson Pailin' manufacture a range of fully tested type 'K' low voltage switchgear, for service up to 660 volts and fully conforming with the appropriate British Standard Specification. Units may be of the pedestal or cubicle type arranged for switchboard mounting; wall mounting designs are also available. Full information on this type of switchgear will be gladly sent on request to interested Executives or responsible officials.



Pedestal mounted Type 'K' Switchgear

FERGUSON PAILIN LIMITED
MANCHESTER, 11 ENGLAND
Switchgear Specialists

Telephone Nos.
MANCHESTER ... DROylsden 1201 (8 lines)
LONDON ... Temple Bar 8711/2
BIRMINGHAM ... Erdington 3775
GLASGOW ... Central 5080

POWER IN THE MAKING

S.G.6

No. 6—Kirkstall Generating Station

There is combustion history in the development of pulverised fuel equipment at this important station. When the plant was designed in 1927 it was considered that a coal carbonisation plant might be installed in conjunction with a central system of powdered coal preparation. This possibility influenced the plant layout.

Coal for the first two boiler houses is pulverised in another building by Raymond vertical roll mills with separately fired dryers. The powdered coal is transported in aerated form to storage bunkers near the boilers.

In later installations, however, the unit system with mill drying is in use, giving a more compact layout. The third boiler house has Impax high speed mills and the fourth, opened in 1948, four LM medium speed roll mills with each of the three boilers. Burners are the short flame, turbulent flow type, placed two in each side wall of the furnace and horizontally opposed. The furnace itself is of modern, fully-cooled design.

To-day at nearby Skelton Grange, even larger 'International' radiant heat boilers with adjustable tangential firing are being built. They, in turn, will be followed by still larger steam generators for unit coupling to 60,000 kW sets giving an ultimate capacity of 360,000 kW.

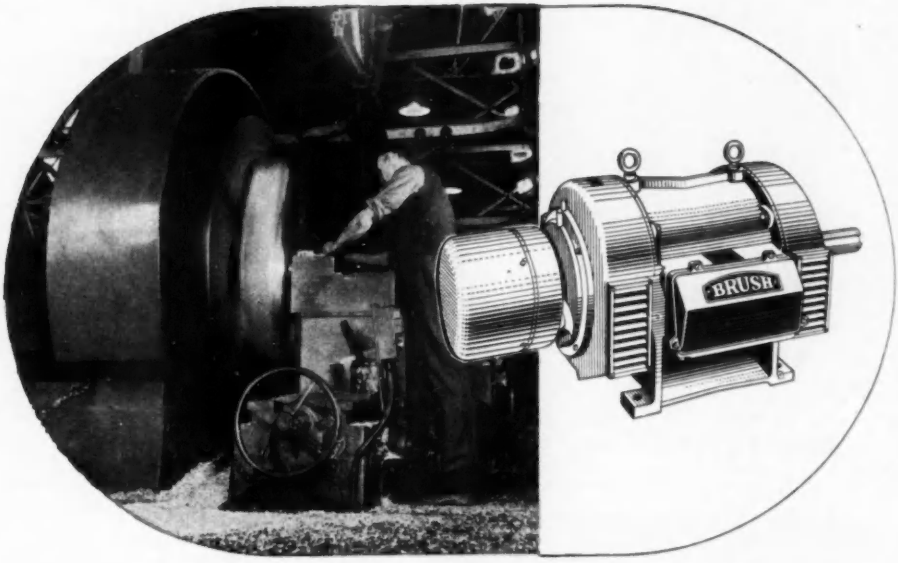
ICL

INTERNATIONAL COMBUSTION LTD

London Office: NINETEEN WOBURN PLACE, W.C.1

Works: DERBY, ENGLAND; PORT ELIZABETH, SOUTH AFRICA; SYDNEY, AUSTRALIA

Pioneer and leader too!



To have been a pioneer proves vision. To have continued to pioneer—as Brush have pioneered for upwards of 70 years—brings that degree of efficiency, economy and reliability which can justly be called leadership.

The Brush range of A.C. motors includes sizes from 1 to 1500 h.p. slipring or squirrel cage. The Brush D.C. range covers standard requirements enabling the most economic size to be selected for any given duty.

the best answer is **BRUSH**

The Brush Electrical Engineering Co. Ltd., Loughborough, England

London, Birmingham, Cardiff, Manchester, Leeds, Newcastle, Glasgow 15.16

BARLECTA

Full particulars given in

LIST No. 1450/T.E.

A request on your letterheading will bring you a copy by return.

B.E.P.C. HARROGATE, Stand 12

NO!

WE put this illustration upside down

DEXRAY SWITCHGEAR

Is not only upright, but reliable mechanically as well as electrically and, of course, is robust in construction.

The DEXRAY range includes

15 amp to **100** amp.

250 and **500** volt class.

D.P., T.P., S.P. and **N.**

SWITCHES—SWITCHFUSES

FUSEBOARDS—NEUTRAL LINKS

Agents :

BARRIES ELECTRICAL AGENCIES LTD.

KING STREET, BRIGHTON 1

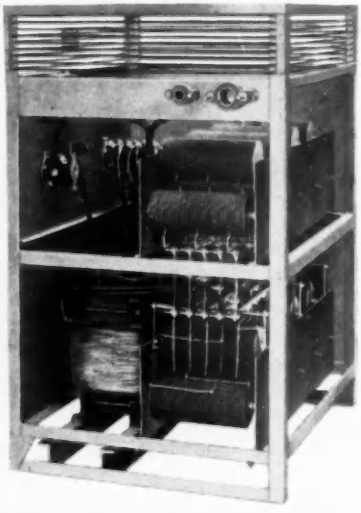
Telephone : Brighton 28366 (PBX)

CRYPTON

SELENIUM RECTIFIERS

for

A.C. TO D.C. POWER CONVERSION



CRYPTON EQUIPMENT LTD

BRIDGWATER SOMERSET

Associated Companies:

Lancashire Dynamo & Crypto Ltd. Crypto Ltd. Foster Transformers & Switchgear Ltd. Nevelin Electric Co., Ltd.

SCOTLAND'S · LARGEST · AND · MOST · HIGHLY · MECHANISED · ALUMINIUM · FOUNDRY

CASTING TERMS MISINTERPRETED

'SAND BLASTING'

" The abrasive process whereby shot or grit is forced by compressed air on to the faces of a casting in order to produce a roughened or matt finish."

Renfrew Foundries possess ample facilities to satisfy all degrees of shot blasting to meet any standards where a matt surface may be necessary if the casting is ultimately painted.

Just another reason why you can and should

RELY ON RENFREW

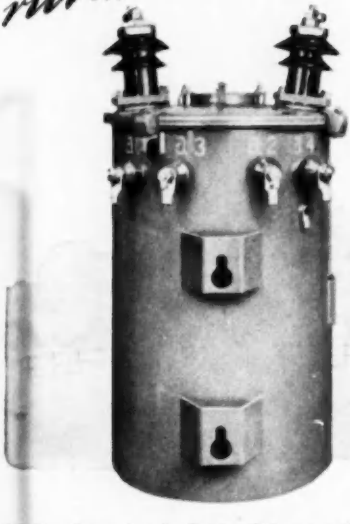
RENFREW FOUNDRIES LTD

IN ASSOCIATION WITH ALMIN LIMITED FARNHAM ROYAL BUCKS

HILLINGTON · GLASGOW · S·W·2 *Tel: HALFWAY 3391*

RF

For your new rural extension



B.P. Standard Pole Mounted Transformers offer the following advantages:

- Reduced capital costs (up to 20% reduction)
- Reduced maintenance costs (being specially treated to resist rust and corrosion)
- Reduced installation costs
- Increased insulation levels (based on impulse tests to destruction)
- Increased efficiency (lower system losses)

Ask for leaflet No. BP308/3

BRITISH POWER

Pole Mounted Distribution Transformers in steel containers

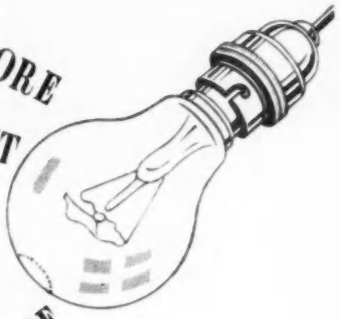
BRITISH POWER TRANSFORMER CO. LTD.

Queensway, Ponders End, Middlesex.

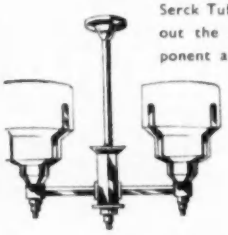
'phone: HOWard 1492. 'grams "Vitrohm, Enfield"

P.B.3083-C.V.

MORE LIGHT ON THE USES OF

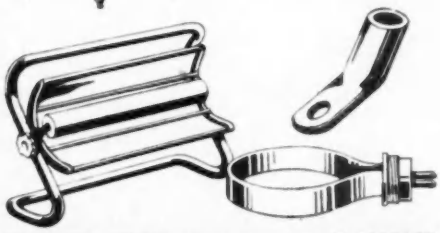


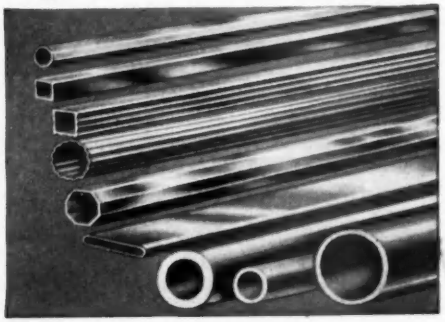
Serck TUBES

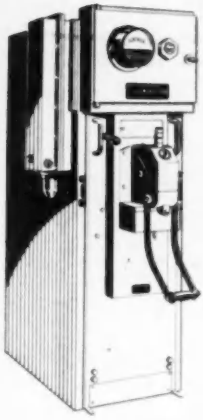


Serck Tubes are prominent throughout the electrical instrument component and accessory trade. Their versatility is in ever-increasing demand.

SERCK TUBES LTD.
Warwick Road,
Tyseley,
BIRMINGHAM 11



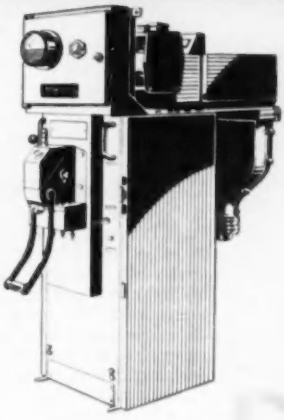




AIR INSULATED—TYPE A.G.

A STANDARD METALCLAD UNIT

adaptable for many purposes



COMPOUND FILLED — TYPE F.G.

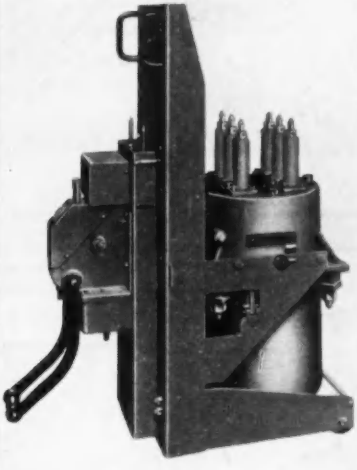
VERTICAL ISOLATION DRAW-OUT PATTERN

•

A. S. T. A. CERTIFIED

•

ARC CONTROL



RATINGS

75 MVA at 3·3 KV

150 MVA at 6·6 KV

150 MVA at 11 KV

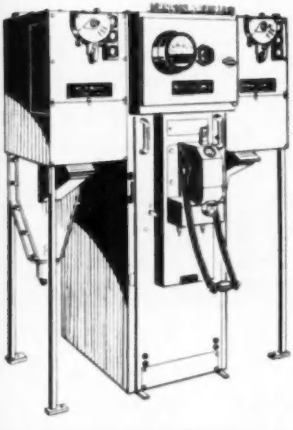
250 MVA at 11 KV

•

MAXIMUM CURRENT

800 amps

RING MAIN UNIT WITH OIL IMMERSED ISOLATORS



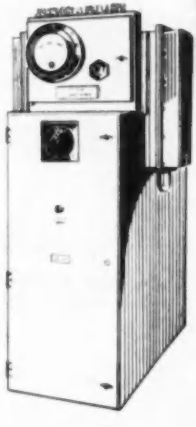
by

JOHNSON & PHILLIPS. LTD.

CHARLTON
LONDON S.E.7

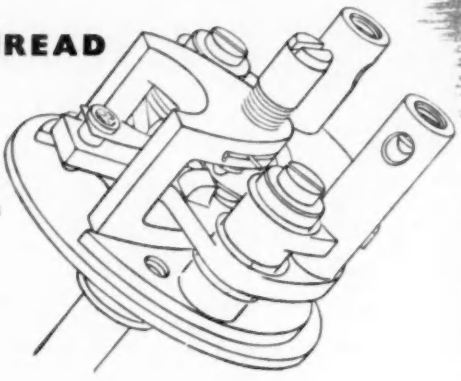
THE MARK THAT MEANS THAT "LITTLE MORE" IN QUALITY

AIR INSULATED UNIT WITH TROPICAL PROTECTION



LIFE

HANGS ON A THREAD



Once it's happened you bear it—but what *might* happen always nags a bit. Those screw contacts hidden away in a water-heater thermostat, for instance? *In the Sunvic we make the electrical circuit all-in-one.* And the little switch that toys with your reputation perhaps 10,000 times a year? *Nice to remember it's that positive-action* SIMMERSTAT *type.* Creeping calibration can be another good-will nibbler — but, again, *not with Sunvic.* Prices are now reduced.

Better feel sure; better fit—

SUNVIC

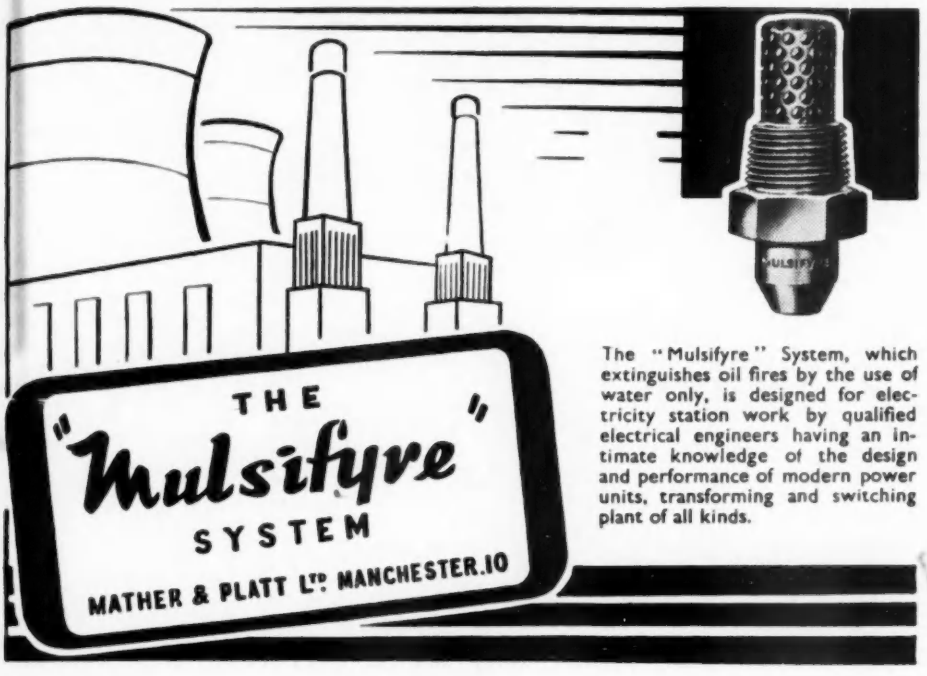
Sunvic Controls Ltd., 10 Essex Street, W.C.2

The **WATER HEATER THERMOSTAT**

with the positive-action switch.

Domestic temperature controls

TAS. SC. 247

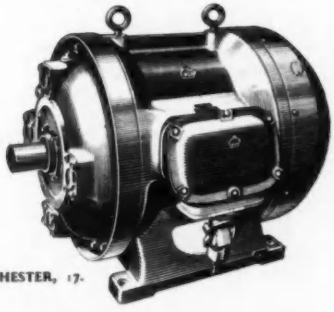


The "Mulsifyre" System, which extinguishes oil fires by the use of water only, is designed for electricity station work by qualified electrical engineers having an intimate knowledge of the design and performance of modern power units, transforming and switching plant of all kinds.

IN THE OIL WORLD THEY SAY ...

"That's good, it's an M-V Motor"

Oil wells and refineries throughout the world rely on M-V electrical equipment. 'Metrovick' experience of motors and their proper application covers all drives in the oil industry, from drilling to refining. Site engineers well know how M-V electrical equipment brings their complex plant into active life.



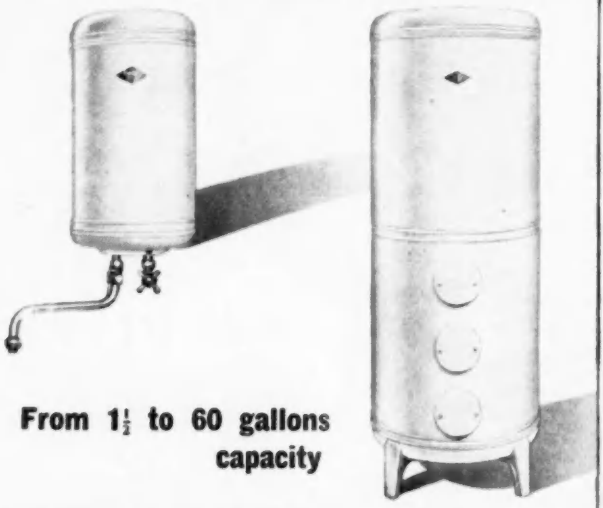
250 h.p. Type FS Motor.

METROPOLITAN-VICKERS ELECTRICAL CO. LTD., TRAFFORD PARK, MANCHESTER, 17.

METROVICK *Motors for all Industrial Drives*

J/M002

We SPECIALIZE in ELECTRIC WATER HEATERS



From 1½ to 60 gallons capacity

IMMERSION HEATING UNITS

For all types of tank

These are times of specialization. The "Jack-of-all-Trades" cannot hope to keep pace with the knowledge and experience that is constantly being amassed. In electric water heating the same holds good—the success of the SADIA is in great measure due to the fact that its makers have specialized. For over 25 years they have worked with one object in mind — the production of the most advanced water heating appliances that good design and manufacture can devise.

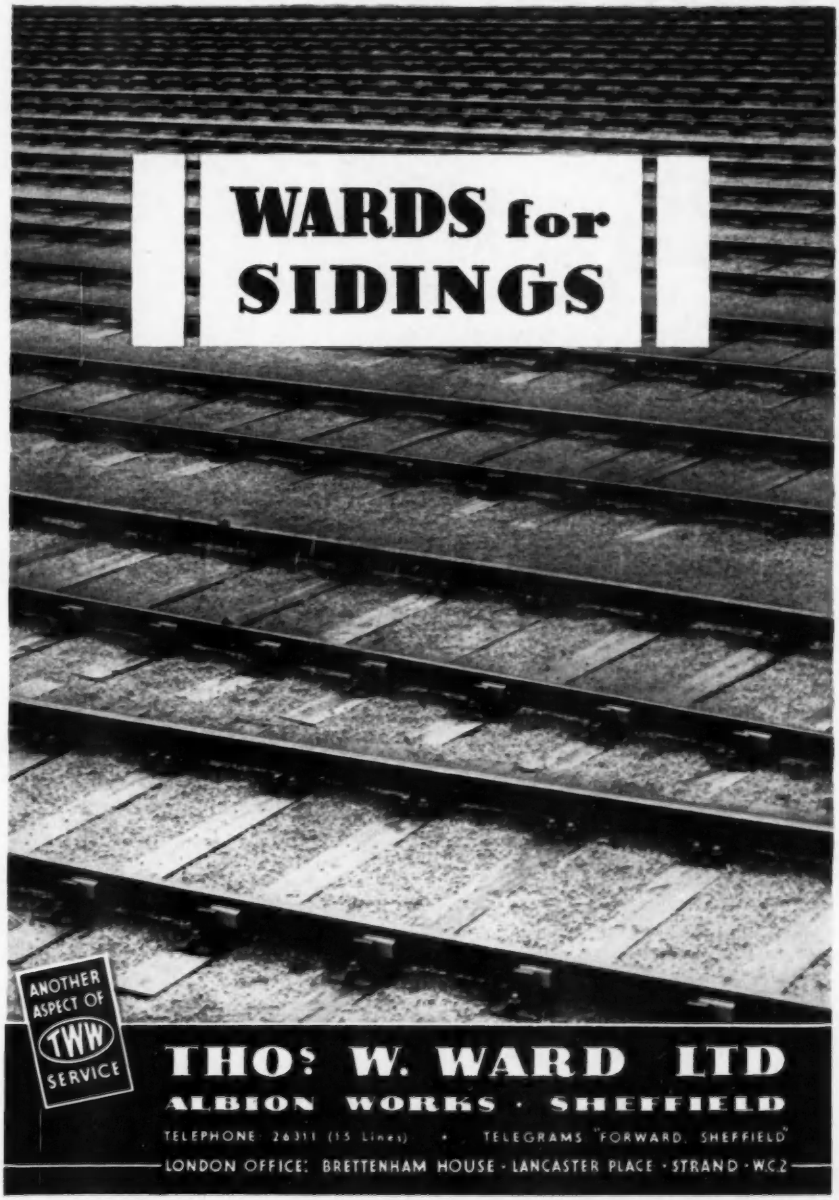
SADIA
HOT WATER BY ELECTRICITY

Aidas Electric Ltd., Sadia Works, Rowdell Road, Northolt, Middlesex. Scottish Agents: W. Brown & Co. (Engineers) Ltd., 89, Douglas Street, Glasgow, C.2. Manufactured in South Africa by: Sadia Water Heaters (Pty.) Ltd., 3-5 Newton Street, Johannesburg.

SEND FOR THE NEW SADIA CATALOGUE

FREE!

Full, descriptive details of Sadia Automatic Electric Water Heaters — Free Outlet, Pressure and Cistern Types. Keep this information ready in your reference file.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THOS W. WARD LTD
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OLD-ESTABLISHED
AMAZING FAMOUS WONDERFUL
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LOWER PRICE BETTER-QUALITY
"TESTS" PROVE · ETC · ETC

or do you buy certified

PERFORMANCE?

ROLLS SWITCHES LTD. sell PERFORMANCE. OFFICIAL and INDEPENDENT TESTS* conducted by the NATIONAL PHYSICAL LABORATORIES on a batch of STANDARD STOCK ROLLS 5-amp Switches have proved conclusively the ability faultlessly to perform over 4,000,000 complete operations on FULL LOAD at 230 volts A.C. and still be in perfect working order both electrically and mechanically. ROLLS Switches have thus achieved the equivalent of nearly 1,000 years of continuous switching on and off an electrical load of over 1,000 watts at the rate of 12 times every day.

This is the measure of switch reliability which could only have been attained by a vast research effort applied to the technical development.

Rolls Switches Ltd., are therefore fully justified in guaranteeing each of their switches to be capable of **at least** 1,000,000 (one million) operations on full 5-amp load, 230/250 volts, or 10-amps at 110/120 volts on A.C.

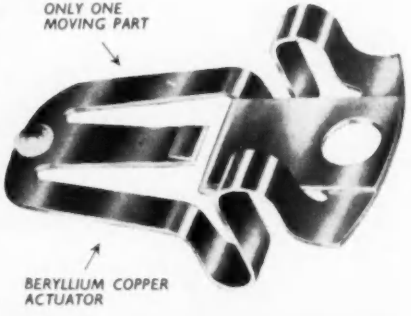
*Certified to comply with B.S.S. 1299-1.

Despite the use of costly materials, the most advanced methods of precision manufacture enable ROLLS Switches to be sold at a cost comparable with ordinary switches.

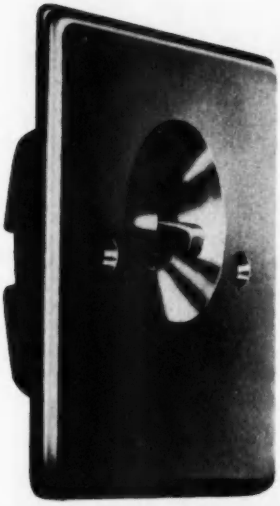
*NPL Ref. ETD 276-3 May 2 1949.

*NPL Ref. BNG/DIV/SOM/AJF/T34 Dec. 2 1949.

THE SECRET OF RELIABILITY



THE ROLLS MILLION OPERATIONS GUARANTEE



SIMPLICITY OF DESIGN MEANS FAULTLESS ACTION

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ONLY ONE MOVING PART

SMOOTH EFFORTLESS SNAP ACTION

SELF-CLEANING SOLID SILVER CONTACTS

SEALED AGAINST DUST AND INTERFERENCE

SOLID SHOCK-PROOF RECESSED DOLLY

FULL 5-AMP CAPACITY

COSTLY MATERIALS ENSURE OUTSTANDING PERFORMANCE

●

SPEED OF CONTACT SEPARATION INDEPENDENT OF USER

BERYLLIUM-COPPER ONE-PIECE ACTUATOR—WEAR AND FATIGUE RESISTANT

LARGE SOLID SILVER CONTACTS

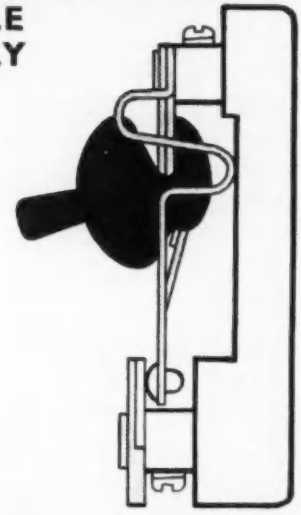
HIGHEST GRADE HEAVY SECTION MOULDINGS

THE ROLLS SWITCH

VIRTUALLY INDESTRUCTIBLE ELECTRICALLY or MECHANICALLY

Because ROLLS SWITCHES have

NO Coiled or highly stressed springs
NO Moving links, pins or spindles
NO Distortable copper contact springs
NO Riveted levers or wearing surfaces
NO Plated or flimsy contact surfaces
NO Fragile or brittle insulation
NO Steel parts to corrode
NO Interior screws to work loose
NO Harsh or jerky dolly action
NO Partial make and break
NO Flabby or slack dolly movement

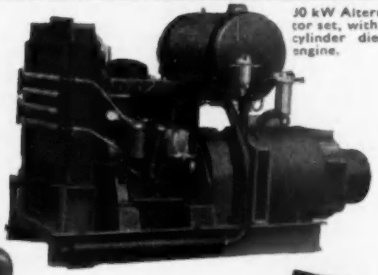


ROLLS SWITCHES LIMITED
154/6, BLACKFRIARS ROAD, LONDON, S.E.1

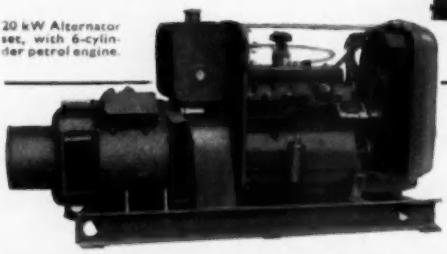
THE WORLD'S HIGHEST STANDARD OF SWITCH RELIABILITY

NEWAGE Diesel or Petrol Engine Driven GENERATING SETS

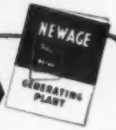
Your own electricity supply from a NEWAGE Generating Set renders you independent—wherever you are. For lasting service and low fuel consumption these robust, compact sets supplied complete with switchboard; 6 kW to 40 kW, A.C. or D.C.



30 kW Alternator set, with 6-cylinder diesel engine.



20 kW Alternator set, with 6-cylinder petrol engine.

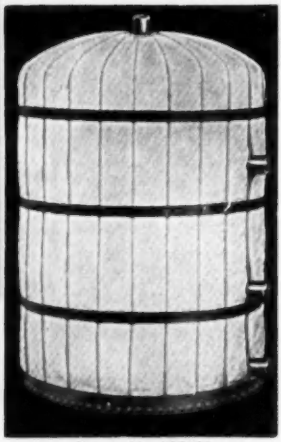


Write for this leaflet which describes and illustrates many different arrangements.

NEWAGE (MANCHESTER) LTD.
DEPT. B, CROSSLEY ST., GORTON, MANCHESTER
Phone: EASt 2071 (4 lines) *Grams:* Newapower

NG.7

SAVE FUEL COSTS



Patent No. 328472

with the

"EETO"
CYLINDER JACKET.

Made in sections. Connecting pipes offer no difficulty. **EETO** jackets considerably increase hot water supply with less fuel.
Used in large numbers by Heating Engineers for Housing Schemes, and extensively in conjunction with Immersion Heaters, etc.
EETO jackets are also made for Horizontal cylinders, square and rectangular tanks.

- **Enormous reduction in heat losses**
- **Finest Insulating Materials only**

Sole Makers:

EETO INSULATIONS
River Street, BOLTON

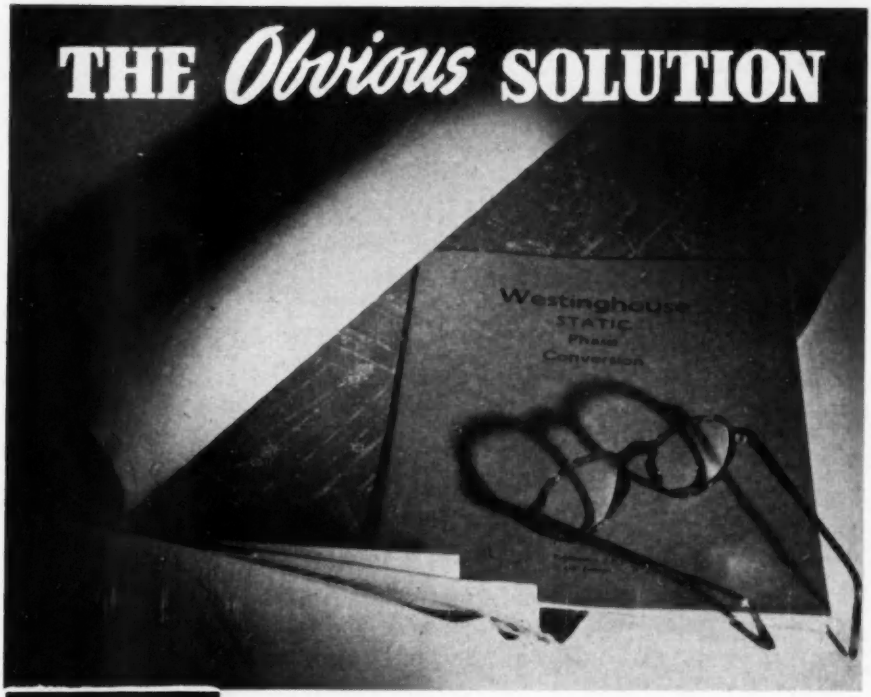
CLOCK CONNECTORS

Sanders Clock Connector is the one selected by leading manufacturers of Electric Clocks for use with their own products. Since its first introduction in 1937, its simplicity, efficiency and neatness have remained unchallenged, and unmatched.

SANDERS
WEDNESBURY

WEDNESBURY · STAFFS · ENGLAND

THE *Obvious* SOLUTION



Suitable for the operation of

Machine Tool Motors

•

Compressors, pumps and blowers

•

Lifts and hoists

•

Non-rotating loads

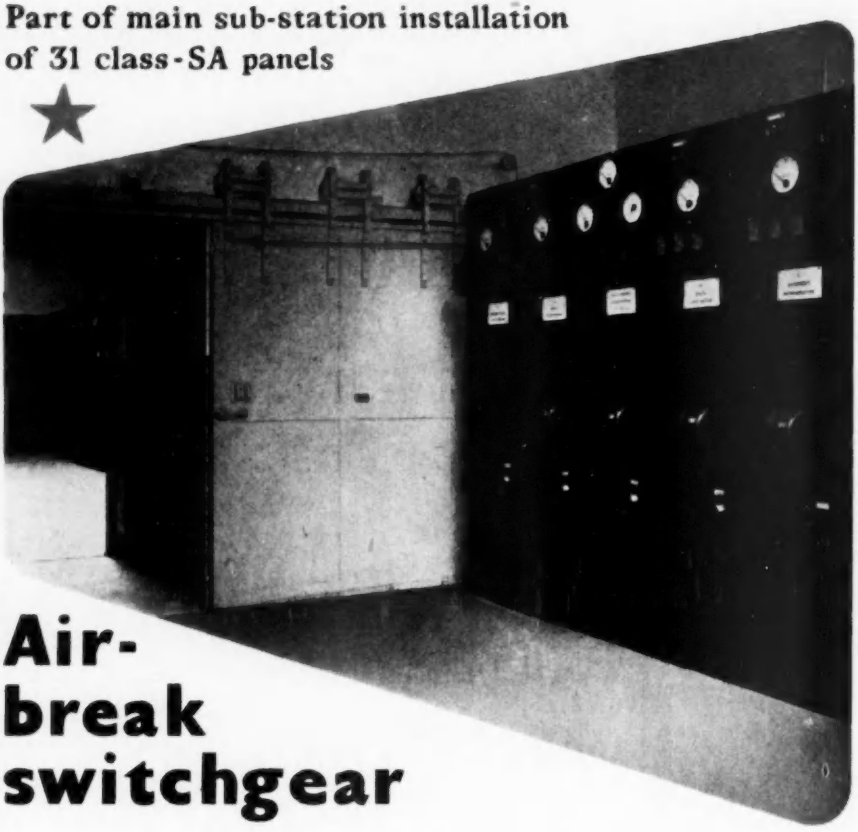
WHATEVER your plans for the future, the Westinghouse Static Phase Converter offers many advantages when 3-phase equipment is to be installed in a single-phase area. It requires no maintenance, attention or foundations. It is quickly and easily installed, and may be added to as the plant extends. It is cheap, and delivery is ex stock.

WESTINGHOUSE

STATIC PHASE CONVERTER

Write for Publication E.E.1
to Dept. E.T.12
WESTINGHOUSE BRAKE & SIGNAL CO. LTD., 82 YORK WAY, KING'S CROSS, LONDON, N.1

Part of main sub-station installation of 31 class-SA panels



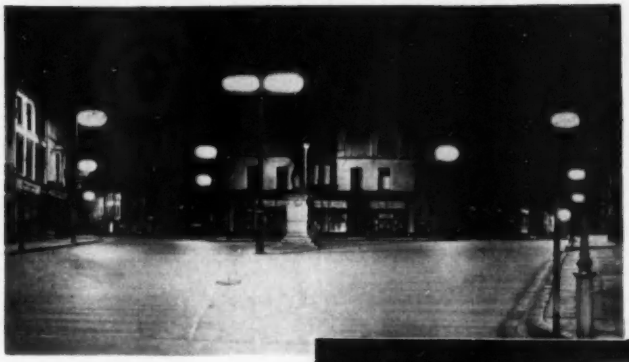
Air-break switchgear

★ AIR-INSULATED
★ METAL-ENCLOSED
★ 415-VOLT
★ 3-PHASE, 4-WIRE
★ 1200-AMPERE

W.D. & H.O. WILLS'S CIGARETTE FACTORY
NEWCASTLE UPON TYNE

REYROLLE
HEBBURN Co. DURHAM ENGLAND

The Lisburn Story . . . .



The biggest Fluorescent Lighting Scheme in Northern Ireland

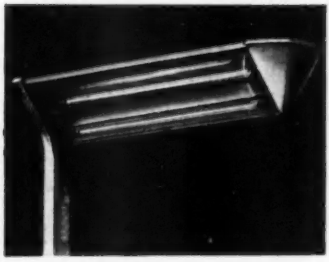
NEW STREET LIGHTING WITH

SIEMENS

SIERAY

FLUORESCENT LAMPS

AND LIGHTING EQUIPMENT



The Wilton-Sieray

The installation comprises 170 Wilton-Sieray lanterns each with 3-80 watt Sieray Fluorescent lamps.

Each lantern is mounted on a column of special design approved by the Royal Fine Art Commission. The scheme is regarded as the most modern in the British Isles and the only one of its kind in Northern Ireland.

SIERAY ***is the answer to YOUR lighting problem!***

SIEMENS ELECTRIC LAMPS AND SUPPLIES LTD., 38/9 UPPER THAMES STREET, LONDON, E.C.4

Belfast, Birmingham, Bristol, Cardiff, Dublin, Glasgow, Leeds, Liverpool, Manchester, Newcastle, Nottingham, Sheffield

B

Burco

ELECTRIC WASHBOILER

CAT. NO.
E840

This "Burco" model represents absolute perfection in Washboiler design. Every detail of manufacture is embodied to ensure a long, trouble-free life and handsome appearance.
Like every "Burco" model, Cat. No. E840 is a product of years of specialisation.

ALL ENQUIRIES TO

BURCO LTD

ROSE GROVE · BURNLEY · LANCS

TEMCO wiring accessories are available in
WHITE
List numbers are clearly quoted in our Accessory Catalogue, a copy of which will be sent on request
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37 UPPER BERKELEY ST., LONDON, W.1 Telephone: Paddington 1867-8-9

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ELECTRICAL TIMES

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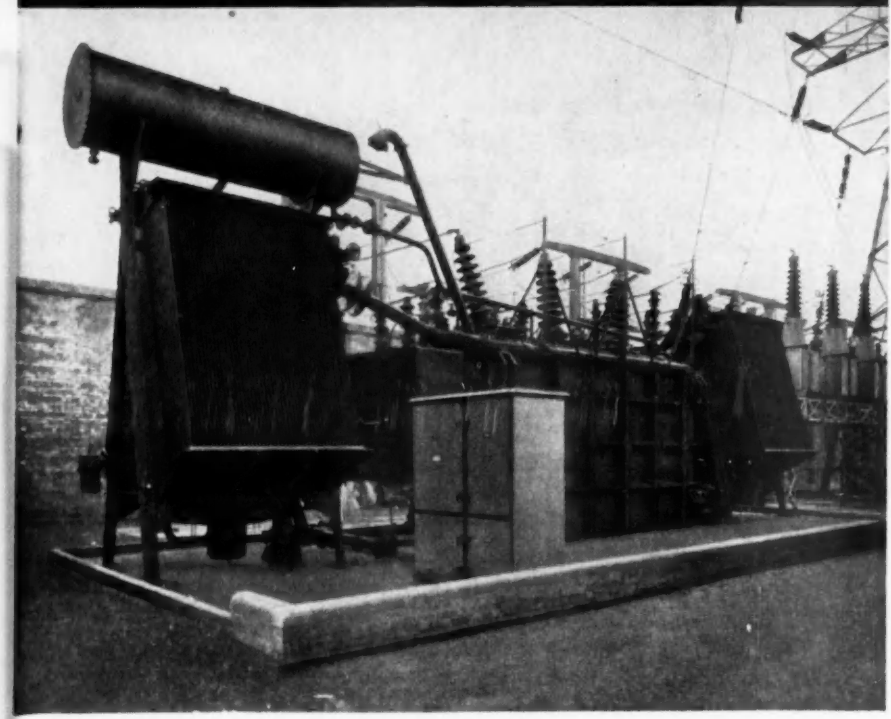
TRANSFORMERS



A 45,000 kVA, 132/33 kV transformer, fitted with 132 kV on-load tap changer, at the Newport outdoor substation of the B.E.A.

by G.E.C.

THE GENERAL ELECTRIC CO. LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2

Editorial

NO DUPLICATION

THOSE who had hoped that Mr. Marshall's recent lecture would include a statement of B.E.A. research policy were doomed to disappointment. From the available evidence, however, it seems reasonable to infer that they do not propose to follow the example of the French supply industry and embark upon large-scale research on their own account, and such a decision would receive universal approbation. It is generally recognised that the majority of research is no longer the result of one brilliant intellect, but is a matter of teamwork at lower levels. Furthermore, the scope of investigation on a particular problem can rarely be accurately defined beforehand—research has an embarrassing habit of refusing to be confined within definite boundaries, and the further away one gets from the original problem, the more specialised knowledge is required until, in the end, either the investigation becomes stultified or the staff and facilities required grows to astronomical proportions. The B.E.A. has quite enough financial worries on its plate already, without indulging in deliberate duplication of existing facilities available in the research organisations and in industry. Obviously there must be a nucleus to initiate research and co-ordinate the work being done by other organisations and manufacturers, but it will do well to leave matters of detail or of fundamental research to others, and concentrate on problems which are peculiarly its own, since no other organisation possesses—or could possibly afford to construct—full-scale transmission systems to investigate problems not susceptible to laboratory analysis.

FLICKER . . .

CRITICS of fluorescent lighting have always made a point of emphasising the trouble which may be experienced due to the stroboscopic effect produced on moving machinery. The comments made by Mr. H. Hewitt in his paper on lighting for the textile industry at the Annual Convention of the Illuminating Engineering Society are, therefore, worthy of note. Pointing out that fears felt by mill-owners on this subject have usually been unfounded, he emphasised that although twin lamp circuits or alternate phase connections are often employed, there have been many instances where these precautions have been omitted without unfortunate results, suggesting that ". . . the fears concerning stroboscopic flicker may have been exaggerated, at least so far as the textile industries are concerned." When one considers the exacting requirements of the visual task in the general run of textile processes, and the nature of the machinery, particularly in weaving, where the number of high-speed reciprocating movements is comparatively large, it seems that it provides a test well above that presented by the average run of mechanical processes. It is a little optimistic to consider that the question of stroboscopic effect can be dismissed entirely. But Mr. Hewitt's paper does show that one of the more regularly-quoted arguments against fluorescent lighting is not so formidable as some would have us believe.

. . . AND DARKNESS

THERE is frequently a pill to be taken with the spoonful of jam, however, and the paper in question provides it in the next paragraph. Maintenance costs of fluorescent lighting, says the author, continue to cause much misgiving. Mill electricians mostly possess a good sense of humour, but are not amused by the complications of lamp and starter switch faults, and the time taken to diagnose troubles is a source of high costs. Unfortunately, this is only too true. When a tungsten lamp fails, barring a blown fuse, the trouble can only lie in the

lamp or the holder. With fluorescent lighting, there are several additional troubles which, in varying combinations, can cause some puzzling results. There are few pocket-books nowadays which do not give directions for rapid trouble-shooting, and one or two booklets specifically devoted to the subject, while many more enterprising electricians have made up handy little gadgets to assist in rapid diagnosis. It would seem that lamp manufacturers would find it in their interests to make information of this type more widely known. Admittedly, the placing of orders for fluorescent installations is not usually the maintenance electrician's prerogative, but prejudice might be able to exert a negative influence.

DR. JEKYLL AND MR. THERM

ROBERT LOUIS STEVENSON'S classic concerning two personalities inhabiting one body was recalled the other day by the sight of showroom premises that had originally belonged to a municipality which owned both electricity and gas undertakings. Now, of course, it finds itself in the embarrassing situation of a house divided against itself. The situation has possibilities, and the formulation of a policy must lead to much heart-searching. If one is to move, which one is it to be? And if both decide to grow in beauty side by side, what sales policy is to be adopted? Competitive publicity campaigns may be carried out with sincerity on both sides, but if they happen to occupy adjacent windows, they are likely to cause more amusement than anything else. The Siamese twin in question seemed to have taken the easy way out, and contented itself with displaying in each window a small selection of its wares marked with cash prices—and that was all. This avoidance of vulgar huckstering may be carrying off the situation with dignity. It is about all that it will carry off, however.

INFORMATION THEORY

HOW MUCH information does an electronic computor have to be given in order to make it a "thinker" instead of a mere calculator? A machine which can beat any human being at noughts and crosses has already appeared, while a machine which will translate from one language to another is in course of construction. "Information theory" was hailed in the U.S. as an outstanding event of 1949; in this country we doubt whether the back-room boys had bothered to give it a name, and most of the definitions which we have so far encountered have been more learned than lucid. Roughly speaking, information theory seems to be the evolution of a working basis to determine how much information one must give a calculator to get a correct answer in terms of something else to which it is not rigidly co-related, an example being the evaluation of one language in terms of another. One of the few miscellaneous items of mathematical knowledge which *Meteor* remembers was the voice of a long-suffering lecturer intoning, "Watch your units, gentlemen . . . It is impossible to integrate horses in terms of cows." And now it seems that the electronics boys are doing just that very thing. The march of progress continually makes earlier work look foolish, as the electron theory brought obsolence to the Newtonian atom. Now a dull boom in the background betokens the shattering of yet another bastion of orthodoxy.

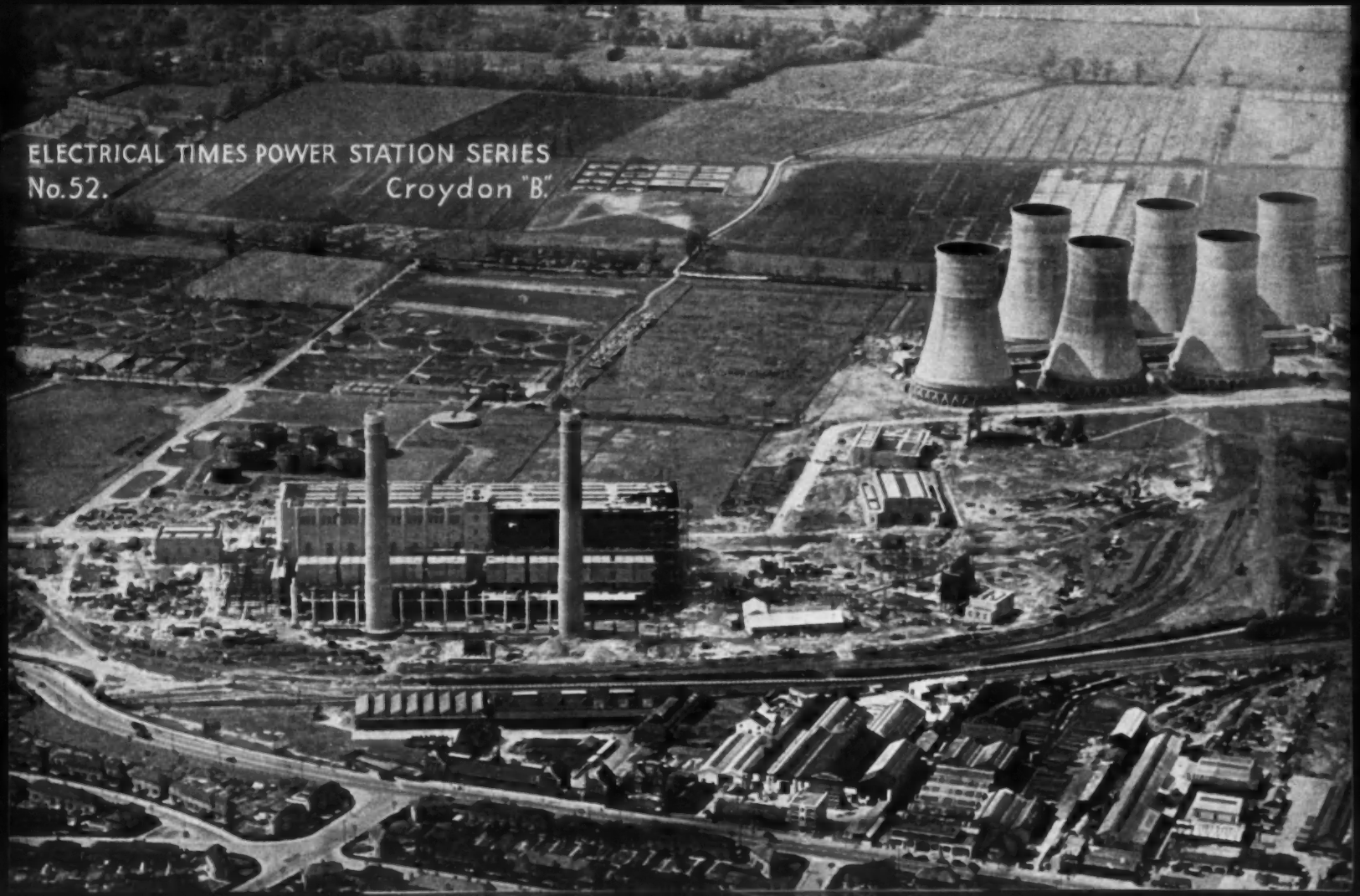
Meteor

THIS WEEK'S PHOTO

ORIGINALLY intended for the Croydon Corporation, Croydon "B" station will be operated by the South Eastern Division of the B.E.A. The station was sanctioned in the latter part of 1939, following a local inquiry, but construction was deferred on account of the war and work on the site was not commenced until September, 1945.

Situated off Purley Way, Beddington, it was originally intended that the first stage should comprise two 30 MW turbo-alternators, with associated boiler plant, but subsequently the plans were amended to allow for the installation of six 52·5 MW turbo-alternators, giving an ultimate capacity of 315 MW.

The first and second sections which are now in course of installation comprise four 52·5 MW Metropolitan Vickers sets and eight 320 klb/hr Simon Carves boilers operating at 650 lb/s.i.g. pressure and a temperature of 875° F. The sets will generate at 11 kV, stepped up to 33 kV and 132 kV. Coal will be brought by rail.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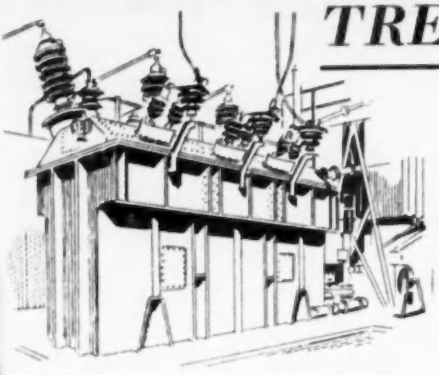
TRENDS in DESIGN



NO. 2. TRANSFORMERS

By E. T. NORRIS
A.M.C.T., M.I.E.E., M.I.Mech.E., F.Amer.I.E.E.

THERE are broadly three influences in changing the design of electrical power plant—the use of new or better materials, improvement in the technique of design and, lastly, change in operating requirements. All of these factors have operated and are operating today in determining the trends of power transformer manufacture. They may be considered separately thus for purposes of concise exposition, but in practice they are, of course, inter-related and interdependent.

The output of a transformer in service is, in general, determined by thermal limitations. In practice this means the maximum temperature the insulating materials will withstand, the corresponding load depending upon its duration and the cooling conditions. For many years dual ratings have been common for the larger power transformers, i.e. with and without cooling by air blast or oil circulation. Natural air cooling was sufficient for half the full output. In this way two transformers connected in parallel normally operated on natural cooling. In the event of one transformer being out of service the other could still carry the full total output with the forced cooling in operation. Automatic means, temperature controlled, were usually provided to bring in the forced cooling when necessary.

This practice still holds, but in a more recent development for large substation units the transformers are normally fully rated with natural cooling. Forced oil or air cooling is provided to permit 25% or so extra rating under emergency conditions, or a larger value as a short time expedient until arrangements can be made for redistributing the load. The forced cooling again is automatically controlled. For this application forced oil circulation alone is frequently sufficient and is to be preferred. The pumps with their motors are completely submerged in the oil so that oil-tight glands are eliminated. This arrangement has been proved practically trouble and maintenance free over 25 years of experience. The power required is small, and operation is practically noiseless compared with air blast cooling. This is an important consideration for substation transformers in residential areas.

In all of these methods the full safe loading of the transformer is utilised irrespective of the nominal name plate rating by controlling the forced cooling from winding-temperature or safe load indicators measuring the hottest-spot temperature of the winding insulation. Whilst the principle of safe loading[1] is by no means new, its practical application has become more widely used in recent years and is extending.

Thermal Rating

The thermal rating of transformers could, of course, be increased if higher internal temperatures were permissible. In oil immersed transformers the oil itself sets a severe limit since maximum oil temperatures higher than 90° C are not considered either desirable or safe. Until recently, however, the temperature limits of the solid insulating materials normally used were not so much higher than this value to justify forgoing the excellent cooling qualities of transformer oil, notwithstanding also its objectionable contribution to fire risk.

The recent development of heat-resisting insulating materials such as fibre glass is broadening the application of naturally air cooled transformers, and this use will doubtless extend if and as these materials and suitable temperature-resisting impregnating compositions become more economical. Generally speaking, this class of insulation is also more fireproof or even non-ignitable, so that the fire prevention precautions necessary with oil can be at least simplified. Nevertheless the great superiority of transformer oil over air in insulating value and in cooling properties

gives it advantages which will not easily be assailed.

Both these handicaps to air cooling can be reduced by employing air under compression. The improvement in insulating value is so important that it has been widely utilised in recent years in gas pressure cables. To realise the benefit of the higher cooling capacity a closed circuit circulating system will be necessary. The practical difficulties to be overcome are formidable, but the possibility must not be ruled out as a future trend.

Electrical Steel

Apart from insulation, the greatest improvement in material characteristics seems to lie in electrical sheet steel. This improvement, in the form of lower watt loss in relation to flux density, has been obtained in sheet steel of normal manufacture by better processing and the reduction of impurities, particularly carbon. This material is now usually known as hot-rolled silicon steel to distinguish it from the more recent and more publicised developments of what is variously called cold-rolled or anisotropic or oriented sheet steel. This material has directional characteristics, the losses being much lower with the flux in the direction of rolling. It is also more susceptible to handling operations, and for the full realisation of its low loss the transformer core must be annealed after assembly. These complications handicap its use in any but very small transformers. It is also, of course, more expensive. On the other hand lower losses have been achieved for this material than for the best quality hot-rolled steel.

The trend in the choice of these two types of steel is not yet clear. Practical experience in transformer building with cold-rolled steel is limited, and the extent to which the lower loss factor can be realised must be set against the greater complication and cost of core construction. This choice will be largely influenced by the purchaser's practical evaluation of the cost of losses. A better quality iron giving a lower loss factor may in fact be utilised in two different ways. The transformer may be built of the same design, but using the better quality iron to give a correspondingly low iron loss. The cost will be higher, but the loss will be less, the net economy depending upon the purchaser's loss capitalisation rate.

Alternatively the design may be changed to give the same iron loss as before, but a smaller transformer with smaller weights of iron and copper. The net economy here depends upon the relation between loss factor and extra cost. Of these two alternatives, the former, if the purchaser actually buys in accordance with the orthodox principles of loss capitalisation (which general experience shows to be very unlikely),[2] will justify a much higher extra cost of the better steel in relation to the loss improvement. This relation is obviously of prime importance to the steel maker in affecting his economics of manufacture of the lower loss steels. Any incentive to him over the comparatively low rate of the second alternative thus depends upon the user and is at present almost unknown, though it will certainly seriously affect the trend of design in this important respect.

Surge Strength

The practical development, chiefly during the last ten years, of accurate quantitative methods of calculating the behaviour of transformer windings to lightning and switching surges is a notable example of improvement in design technique, and this trend is still continuing. For many years the theory underlying surge strength design has been known qualitatively and hence also most, if not all, of the essential parameters. It is now, however, possible to calculate accurately the stress distribution and corresponding surge strength for any practical type of surge and any practical type of transformer winding. Apart from Stress-Control, which co-ordinates the stresses due to the insulation capacitance with its own dielectric strength and should be implicit in any design, the basic principle in improving the surge strength is to increase the capacitances between turns and coils, particularly near the line end of the winding. It is as simple as that.

An obvious method is to connect suitable condensers to the coil connections. This has been done successfully, but is not a common practice. Other methods include adding electrostatic shields and distributing the winding, i.e. interleaving turns of adjacent coils. These methods are not mutually exclusive and can be combined in any degree. The various combinations will probably depend not only on the voltage and kVA ratings of the transformer, but also on the particular makers' shops technique. Ten years ago the dominant urge on transformer designers was to achieve the highest possible surge strength. The aim now is rather to achieve a limited and specified surge strength in the most economical manner. The trend for some years to come will be in development along these lines. It may well be that in the course of this evolution the variations between individual makers will become more narrow.

Standardisation

A major influence on the trend of transformer design in the near future will ensue from the impact of nationalisation upon the supply industry. It is natural, for example, that individual area boards will wish to standardise transformers within their own area and there are already indications of this tendency. It seems likely that the liaison between the various area boards and the B.E.A. itself, and the technical co-ordination which is in process throughout the country, will lead to a national unification both in construction and performance profoundly affecting every class of power transformer. There are, of course, possibilities here for improvements in both production and utilisation efficiency which can be greatly to the national benefit. The resulting standardisation and uniformity must not, however, be allowed to stultify or discourage individual initiative and enterprise, and due consideration must be given to the export trade which has long been, and still is, an exceptionally large and important proportion of the country's transformer manufacturing capacity.

[1] (The Safe Loading of Oil Immersed Transformers Trans. A.I.E.E. Oct. 1929).

[2] ("Capitalisation of Performance" Journal I.E.E. April 1946).

Our readers' views . . .

Advertising of Vacancies

I CANNOT agree with your correspondent "Nomad" holding that vacancies on the Electricity Boards should be advertised nationally instead of internally. Surely employees, by virtue of their longer service alone, should have first opportunity of better posts. This, in my opinion, holds good for any branch of the industry with a central association.

Perhaps, however, your correspondent holds the view of one company, which replied to an advertisement I inserted in a technical journal, asking if I were already employed in their line of business. When I replied in the affirmative, giving details of my experience, they said that they noted this and had no vacancy to offer me.

ESSEX *F. J. Cooper*

• • •

Shift Workers' Promotion

LETTERS from several correspondents have recently been published regarding the new conditions for membership of the I.E.E. and the possible effect on shift workers.

Some engineers employed on shift work have travelled 20 miles or so to attend classes at technical colleges, but others with facilities much nearer their homes have not attempted to do so, and will not, even on five shift cycles.

In olden days the trained unqualified men were capable of carrying out the duties of engineers of those times, but with complex modern machinery the qualified (i.e., Higher National Certificate and upwards) men should receive prime consideration for the senior positions as inferred by Deputy Chief Engineer in his letter published in the *Electrical Power Engineer* dated March 1950. Allied with this problem is that of internal promotions which appears to be coming into force.

This, I consider, is regrettable as it will encourage the yes-men and cause stagnation amongst the more progressive elements of the electric supply industry who, naturally, do not wish merely to improve their positions, but to gain as much experience as possible, and keep themselves informed of modern trends.

H.N.C.

• • •

False Security

THE letter headed "False Security" prompts me to relate a parallel experience. My parents, then living in South Molton, Devon, had an electric washing machine, connected to a two-pin outlet, with an earth wire from the machine to the water tap. When trouble developed with the switch, the local electrical contractor said that a three-pin switch plug was essential, and he was therefore instructed to fit one.

On my next visit, I was told about this, and knowing that the wiring was twin core with no earth, I held an inspection, only to find, with "Chartered Electrical Engineer" that there was no connection whatsoever to the earth pin of the three-pin switch plug. Needless to say, I rectified the omission promptly, with a lead to the nearest water pipe, but it makes one wonder how many people are living under a similar delusion of security; also, where the "contractors" got their experience.

J. W. Barber

BECKENHAM

Repair Shop Testing of Induction Motors

By D. E. BARBER

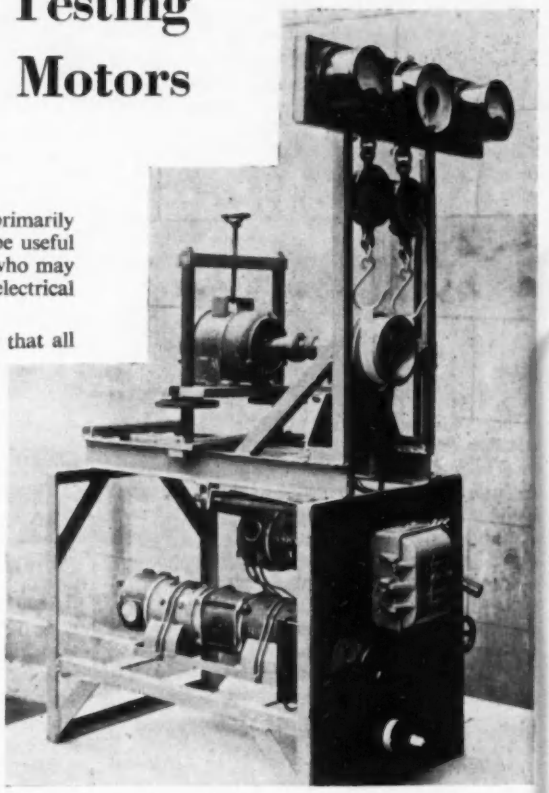
THESE notes, although written primarily from the repair shop angle, may be useful to maintenance engineers and others who may be called upon to carry out repairs on electrical motors and machines.

The purpose of testing is to ensure that all faults have been rectified during the repair, and that a further period of useful service life can be anticipated. Unfortunately, the practice in many repair shops is to pass out the machine on the strength of a "light run." This may be due to lack of reasonable testing facilities, insufficient time, ignorance of testing technique or a combination of these factors.

It should not be inferred that, by the above remarks, the writer is condemning the light run, for it can be a most informative test. On the other hand, from a repair shop point of view, it must be supplemented by other tests before every possibility of faults can be ruled out. Obviously, the more elaborate the testing arrangements, the more certain can the client be of getting back a sound electrical machine. From the economic aspect, however, it is only in the medium-large range of motors that it will be found possible to carry out anything like complete tests. Extra large machines require an excessive plant capacity whilst the smaller motors cannot carry too high a test bed labour cost.

In addition, where a machine fault has to be diagnosed, certain preliminary tests may have to be carried out. Even when the fault is apparent, the cause may be obscure and the leading repair shops make a point of investigating site conditions in any doubtful case.

Summing up then, it can be said that all testing should be reduced to the minimum consistent with reliability and that the tests which are carried out should be conducted in a methodical and scientific manner.



Fixture designed for rapid brake testing of induction motors

Load Testing

When technical and economic considerations will allow, load testing should be carried out, as there are certain faults which become apparent only after a period of loaded running. Also, it should be borne in mind that a full load run is sometimes more conveniently carried out than a series of shorter tests with their associated change of connections.

F.H.P. motors often present tricky problems on the repair shop test bed and in many cases a full load test is the only certain way of verifying the soundness of the machine. The reason for this is fairly simple but is often overlooked, namely, that the electrical and magnetic conditions in small induction motors vary considerably between no load and full load. These variations are much less pronounced in the case of larger machines.

Because of this feature, it is the writer's considered opinion that every F.H.P. motor should be checked for starting performance and B.H.P. output as a matter of course. Some engineers may disagree on this point, arguing that the cost of F.H.P. motor repairs is high enough without adding to the expense. However, there is no reason why a properly conducted load test should result in any serious increase in the cost of testing.

The apparatus illustrated was specially designed with these points in view and, with its aid, it is a simple matter to carry out brake tests and to determine starting, maximum, and pull-out torques of small machines up to about 2 H.P. Two methods of loading are possible, a friction brake for small outputs, and electrodynamic loading for larger outputs or more prolonged tests.

For load testing larger machines, a very convenient method is to couple the motor under test to a variable speed commutator motor. Although the initial expense of this equipment is high, the convenience and ease of adjustment is ample justification for its use.

Using this method, the speed of the commutator motor is matched with that of the motor on test. In this state both machines "float" on the line, but if the commutator motor speed is raised or lowered, respective generator or motor action of the test machine will result and any desired load can be quickly applied.

Where Load Testing is Not Possible

If it is considered inadvisable to carry out a true load test, a choice must be made from the following in order that the machine can be considered satisfactory.

No Load Test

This test is very important as it provides one of the vectors from which the circle diagram can be drawn. It also discloses shorted or wrongly connected stator windings and indicates a reversed stator phase winding.

The magnetic circuits of normally designed induction motors usually operate somewhere near the "knee" of the magnetisation curve. A few points on the no load curve, taken at different values of line voltage, will therefore check the magnetic circuit. By this means, any wrong interconnection of phases (i.e., star instead of delta, or vice versa), at once becomes apparent.

In addition, the no load test also reveals mechanical troubles such as an unbalanced rotor or a rough bearing. It should be remembered, however, that it does not check the rotor winding in any way.

Running Up Test (squirrel cage only)

If the motor can be accelerated from standstill, against a brake load, important operating information can be obtained.

Noisy acceleration can usually be attributed to broken rotor bars, whilst "crawling" at some sub-synchronous speed usually denotes harmonic depressions in the speed-torque curve. On this latter score, the running up test may be considered essential whenever a motor has been redesigned for a different number of poles.

As a guide to this test, assuming that a motor started direct on line develops a minimum of 100 per cent. full load torque throughout its accelerating period, values for other methods of starting should be as follows :—

Star-delta	30 per cent.
Series-parallel ..	25 per cent.
Split-phase	15-20 per cent.

Open Circuit Test (slip-ring)

This test checks the stator-rotor voltage ratio and is carried out with the machine stationary. Unbalanced slip-ring voltages suggest the probability of incorrect rotor connections. If, during this test, the power input to the stator greatly exceeds that occurring at no load, full speed, then shorted sections of the rotor winding may be present. This suspicion may be confirmed by rotating the open circuited rotor slowly by hand with the stator energised. Fluctuations in the line currents and a tendency to run up to speed is proof of a rotor fault and very often the affected coil will overheat.

Short Circuit Test

The short circuit or locked rotor test cannot be used for fault location but is nevertheless valuable when it is desired to complete the circle diagram. Measurement of the starting torque of squirrel cage motors can conveniently be made during this test.

Insulation Tests

At the completion of the running tests, all machines must be subjected to insulation tests. If a complete rewind has been carried out, then flash testing to B.S.S.168 should be proceeded with. If, however, only a section of the winding has been renewed it is probably advisable to dispense with such a test and rely on a measurement of the insulation resistance, preferably taken with a 1,000 volt "Megger."

(Thanks are due to British Electrical Repairs Ltd. for permission to reproduce the illustration of the F.H.P. brake testing machine.)

Producing Plastic Commutators

Ingenious Production Methods at Hoover's High Wycombe factory

COAL to Newcastle—vacuum cleaner components to the United States. The two achievements are on the same level of enterprise, yet the second has been realised by the Hoover organisation, based on the work of its factory at High Wycombe, Bucks. The story of the building up of this production unit makes a worthy background for the technical interest of the details of plastic commutator manufacture. During the war a dispersal unit of Hoover's, staffed by some 500 people, was established at High Wycombe in a disused furniture factory. When the direct work of this unit came to an end it was thought desirable to retain the team of supervisors which had been built up. Accordingly a suitable factory was obtained on the outskirts of the town, and used at first to produce spare parts for the servicing of Hoover appliances throughout the world.

The production unit having shown its capabilities, it was entrusted with the manufacture of the Hoover "Dustette" hand cleaner, and again achieved a promising performance. At about this time, the development of a commutator design which required no mica was reaching finality in the Hoover laboratories, a result of a project started during the mica-scarce wartime years. For production of this new component the High Wycombe factory was selected, and by 1946 work was in full swing. Previous commutators based on copper bars set in plastic had been very limited in application, but the new design was rapidly brought to a quality where it could be used on all Hoover products.

Inquiries from outside manufacturers followed, and at the end of 1948 it was decided to explore the American market for small commutators. The few orders received as a result of this effort soon multiplied, and now some 65% of the production at High Wycombe goes to North America, and sales are limited by the production capacity of the factory. The selling points which produced this satisfactory result include production at about two-thirds of the cost of a fabricated copper and mica commutator and a more consistent and a more homogeneous unit.

Production Details

Some 55 different designs of commutator are manufactured at present, having from three to forty bars, with diameters up to 1·3 in. and bar lengths up to 0·6 in. To make this wide range of products, three different methods are in use, and these will be described in turn.

For the larger commutators the starting point is always a high conductivity copper bar, which is cut to give the rack-like section shown in Fig. 2. This is transformed to a hollow cylinder, with the teeth inside, by forcing round a mandrel, and the commutator form is then obtained by moulding a brass bush in position at the centre of the cylinder. This effectively keys the copper cylinder in position, and its outer surface can be turned away to leave firmly held discrete bars, which after suitable finishing give the normal commutator section.

The copper section shown in Fig. 2 has a wide primary slot and a thin secondary slot. When the number of bars required is relatively low, the secondary slots are omitted, and when the moulding stage has been completed, the outer surface is cut through to give the required number of commutator bars.

Finally, for the smallest commutators, a simplified technique has been evolved whereby

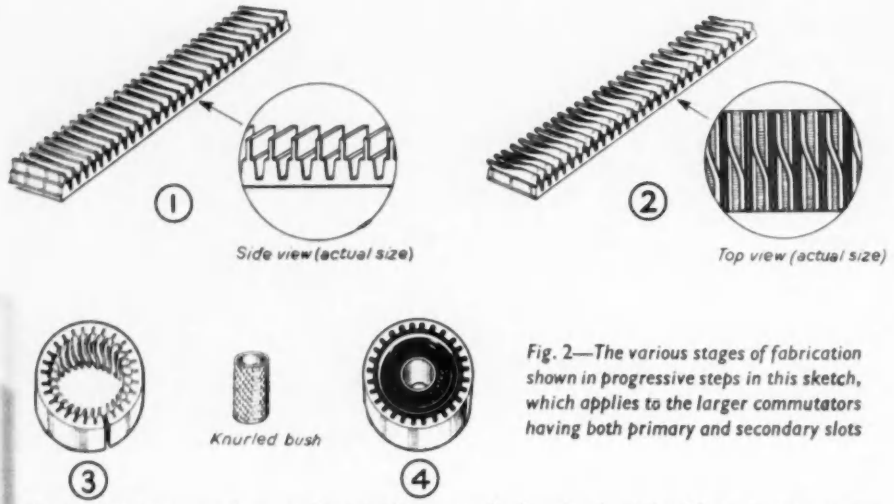


Fig. 2—The various stages of fabrication shown in progressive steps in this sketch, which applies to the larger commutators having both primary and secondary slots

a circular disc of copper is pressed out to form a pot-shaped unit with teeth inside. Paring off the bottom produces the toothed hollow cylinder formation, and this is then treated similarly to the solid backed type just described, with the important exception that no brass bush is used, the plastic being left splined on its inner surface to form a direct force fit over the motor shaft in its eventual use.

Although so simple in their general idea, these novel methods of commutator manufacture have required considerable development to bring them to their present state of production efficiency, and considerable interest attaches to the detailed methods now in use. Although attention here is confined to the manufacturing and testing technique, there is much of interest in the layout of the machines, which is designed to minimise handling between operations and so economise still further on production.

Two production lines are maintained, one dealing with commutators for use within the Hoover organisation, and the other for those to be sold outside.

Secondary Slot Designs

Where the starting point is a copper bar, lengths equal to the outer circumference of the required copper cylinder are cut from strips of high conductivity, low oxygen content copper which are delivered to the works in lengths of 12 to 15 ft. To obtain the rack formation required on these, a vertical broaching machine has been developed, and is shown in action in Fig. 3. The copper bar is fitted into one of four holding positions on the machine turret, and gripped only at the sides and the rear edge, and then indexed into position. The broaches are gripped in block formation, with a 0·002 in. overall tolerance, and are forced down across the face of the copper, the bottom broach cutting the primary (wide) slot, and the upper broach the secondary (narrow) slot, where this is required. As cut, the secondary slot has the section of a truncated triangle, so that after the distortion caused by forcing round a mandrel its sides will be parallel.

The broach (Fig. 3) is an electro-hydraulic machine, having an electric motor-driven pump incorporated to build up the pressure required. Safety devices fitted include a pad below the broach which automatically stops the tool if it fouls anything during the downward stroke, and so protects the teeth of the broach from damage due to contact with the steel tooling. Fitting up the machine for a new run takes about four hours, and the life of a broach between regrinds is about 20,000 operations.

Incidental to the broaching operation is the formation of small burrs on the back face and the side of the rack. These must be removed because, in the completed commutator, they could form voltage-concentrating points and lead to a breakdown between bars. To accomplish this removal the racks undergo a wire brushing treatment, one of the machines used being shown in Fig. 4, and afterwards they are ready for the one further operation necessary before passing to the shaping machine.

This is the bending of the teeth to secure a firmer hold on the plastic when moulding has taken place. The operation is quite simple, the base of the rack being firmly held while a tool

split along its centre line engages the teeth. The two halves of the tool then move in opposite directions, displacing the teeth as shown in Fig. 2. After the operation, the teeth are so bent that in the cylindrical state they become non-radial (offering resistance to centrifugal forces) and for some distance at an angle to the axis (strengthening against longitudinal forces). In some of the longer commutators the distorting tool is in three parts, the centre section moving in the opposite direction to the two outers.

Tooth Bending

In the early production methods the distortion was performed on a hand-operated fly press, but now it is combined with the bending operation about to be described and is completed on the machine shown in Fig. 5. On this the teeth are first bent and then the rack is pushed round a mandrel. At first the outer surface is somewhat irregular, with many flats, etc., and to secure a smooth surface a tapered spindle is forced down through the centre of the hollow cylinder, thus pushing the outside against the containing walls of the tool and producing a smooth surface. This is specially important, since the outside diameter is a locating dimension for the moulding operation.

Another cleaning operation now takes place, the cylinders being acid-dipped to give a clean surface and to remove any slivers of copper that may be present. A sampling inspection is carried out at this stage, and if the batch is satisfactory it passes to the moulding section.

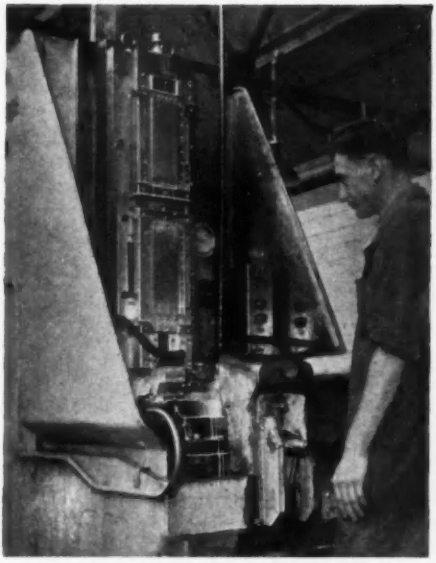


Fig. 3—Surface broaching machine

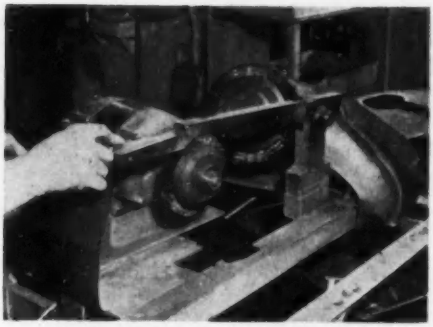


Fig. 4—Twin head wire brush machine

Brass bushes also finish up at the moulding section after knurling, acid-dipping to remove any long splinters of brass, and inspection of bore dimensions to ensure suitability for pressing on to a motor shaft.

Moulding and Machinery

Three-section multi-impression (Fig. 6) moulds are used in conjunction with a good grade of Bakelite powder, the presses in use ranging from 25-ton to 150-ton models. The average tool size is six-cavity, but some are in use with a capacity of 16 commutators. The copper cylinder is held in the centre section of the mould, with the bushes retained on centre pins. A cure time of about three minutes is necessary, and this is somewhat critical. At some time after moulding, commutators are aged in an oven for between 24 and 36 hours, so that all trapped gases are removed.

Commutators made with a secondary slit and those having a solid back have different treatment from this stage onwards. The former are rough turned to remove the $\frac{1}{32}$ in. of continuous copper that remains on the surface.

Those commutators which have no secondary slit go to a pot broaching machine, which is supplied with up to twelve broaches which cut down through the solid copper backing to separate each bar from its neighbours. A typical broach, shown in Fig. 7, has twelve sets of teeth, and the commutator is pressed down past them by a hydraulic ram. Obviously, the slots cut must be correctly related to the keying teeth, so that each bar is held by one or more teeth, and for this purpose the joint in the copper cylinder is used as a location mark. During the moulding operation flash collects in this and makes it rapidly identifiable.

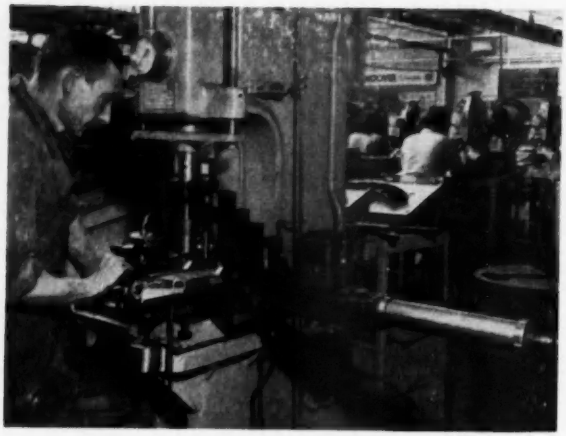


Fig. 5—Teeth twisting, curling and sizing machine

By varying the number of cuts made, a range of commutators may be obtained from the same "rack." For instance, a 24-toothed rack could give a 24, 12, 8, 6, or 3-barred commutator, with different numbers of keying teeth per bar. The 24-bar model, however, would probably be made by the secondary slot technique.

Shell Commutators

There remain to be described the manufacturing processes used for the smallest commutators. As has been stated, copper rod is the starting point, and this is parted to give, in a typical case, a disc about $\frac{1}{4}$ in. thick and $\frac{5}{8}$ in. in diameter. This is pressed out in a punching die to pot shape, some $\frac{13}{32}$ in. deep, having on its inner walls straight teeth, which will later act as keying projections. During the pressing a slot is cut on the outside of the shell to act as a location for subsequent cutting operations.

The next step is the paring off of the bottom of the pot, which results in an internally-toothed cylinder, some $\frac{13}{32}$ in. long being left, ready for the moulding operation. As is mentioned above, no brass bush is used for these small commutators, which are intended for such applications as windscreen wiper motors. Instead, the central splined bore is left in the moulding, which can be forced on to the motor shaft. Cutting of the solid copper to form commutator bars is performed later, giving in the example described, a seven-bar unit.

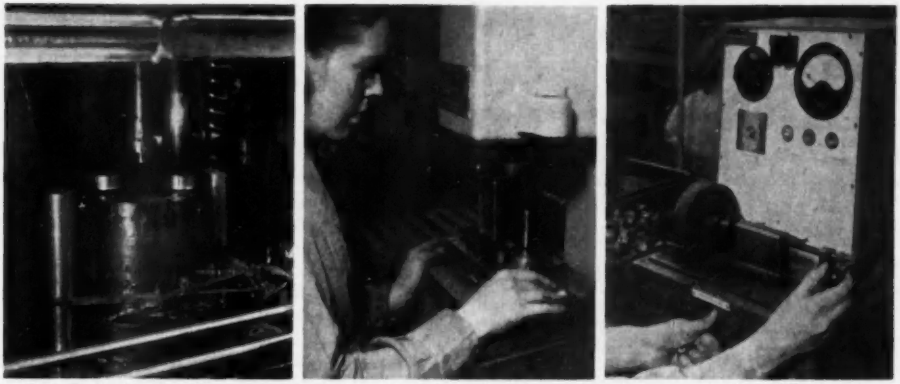
Testing

Apart from dimensional inspection, the routine testing of commutators involves a thorough electrical test, including a voltage test of 500 V, bar to bar, and 1,500 V from bars to bush. Various test sets have been developed to speed up this process, and one is shown in Fig. 9. Here the commutator is pushed into a jig which brings a contact down on every bar, and automatically applies the bars to bush test. When a button is pressed the necessary voltage is developed between bars. Indicator lamps are provided to show when a fault of either kind occurs.

Commutators are also tested to determine the effect of overspeed on the bars, and here one advantage of the plastic commutator over the traditional fabricated type is specially apparent. Actual testing speed is 35,000 r.p.m., but on test at 50,000 r.p.m., radial bar movement was found not to exceed 0·0002—two-tenths of a thou.

Bush bore dimensions are kept to within 0·001 in., so that the normal interference on the motor shaft is from 0·0004 and 0·0014 in. The outer commutator diameter has a tolerance of 0·005 in., with a maximum eccentricity of $\pm$ 2½ thou. Consequently when the commutator is trued up after mounting, only some 0·005 in. of copper need be removed.

Fig. 6—The 25-ton commutator moulding presses



Figs. 7, 8, 9—The three operations of pot broaching, bore broaching the centre bush and final testing of the plastic commutators are shown in these close-up photographs

This fixed inspection is reinforced by the activities of travelling inspectors who take random samples at various stages in the course of manufacture and so keep an extra check on production smoothness.

Oxidising

All the processes described above take place before the despatch of the commutators to the ultimate users, either the Hoover organisation or some company making its own motors. In the case of the solid-backed and the pressed commutators one more operation is included—all exposed copper is heavily oxidised by immersion in an acid bath. The purpose of this action is to facilitate soldering connections when the winding is attached to the commutator. Before this, slots must be cut in each bar and these will provide the only clean copper surface on the commutator. If the whole commutator is now solder-dipped, the metal will only adhere to this clean surface, and it can later be melted for the purpose of winding connection.

Assembly

Further steps in the use of the commutators can be seen in the motor assembly section at High Wycombe. Commutators of the secondary slot type must first be undercut, because tracking might otherwise develop across the Bakelite between bars, and slotting for the purpose of winding connection is then necessary, as has already been described. It is then forced on to the shaft, and laminations and coils are built on. Finally the commutator is diamond-turned to give true concentricity with the shaft, and lightly wire brushed.

The motors so built are dynamically balanced by the addition of small weights, and afterwards undergo a vibration check. Flash tests and growler tests are applied to determine the soundness of the winding insulation and of the other parts of the motor.

Plastic Commutator

Although the plastic commutator has many inherent advantages over the fabricated type, the tooling required for its production is undoubtedly costly, and the favourable price relationship is only obtainable if very long runs are possible. This introduces the need for commutator users to accept standard dimensions if they are to get the best value, and not to demand that every individual preference be met.

Experience so far gained tends to show that motor manufacturers are willing to put up with this restriction if the advantage to be gained in price and performance is sufficiently great, which, with the plastic commutator, it often is.

Production of the plastic commutator lends itself admirably to flow line production, and some changes are planned at High Wycombe to streamline still further the already admirable layout of plant and machinery, and so reduce the handling necessary.

A small but well-equipped toolroom is attached to the factory, and many of the tools and moulds required are made here, while all are maintained by this section. It includes a special machine for grinding the broaches used on the vertical machine, and this adds further to economy in operation.

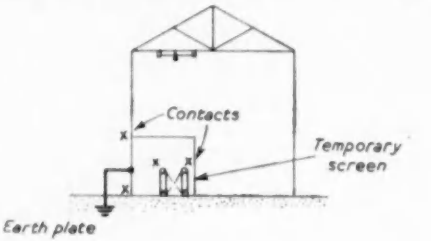
We have to thank Mr. Austin, works superintendent at Wycombe, and Hoover Ltd., for facilities to obtain the information recorded in this article.

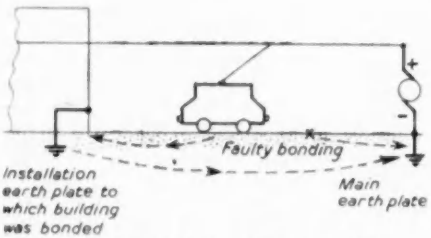
Problems and Practice

IN ENGINEERING

Inefficient Earth Bonding Fault

EARTH faults and faulty earth bonding are often the cause of quite freakish effects which can be rather baffling at the time. A case occurred in which heavy flashing took place between the corrugated iron sheets of a building although no shock was experienced. A temporary screen of these sheets, which were mounted on a wooden frame, was being dismantled from an iron framed building. This building was an unloading bay situated about 500 yds from a main works and was served by





Figs. 1 (above) and 2. Details of earthing installation and electric factory locomotives

250 V d.c. locomotives, operating on an overhead trolley system with an earthed return through the track rails. Tests were carried out and it was found that there was a p.d. of 15 V, between the terminus buffers and the building, when a locomotive was travelling along the track with maximum load. The building contained a number of medium voltage a.c. motors and the installation was provided with its own earth plate which had a resistance of 1·3 ohms to the general mass of earth. The section of track inside the building was set in dry concrete. It was found that the sheets of the temporary screen were making contact with the back of the buffers frame and the building, thus accounting for a flow of current through them, the building being bonded to the earth plate (Fig. 1). It then became obvious that the cause of the trouble was faulty track rail bonding at some point. Further investigation disclosed that there was no p.d. between the buffers and the building until the loco. had passed a certain point in the system. It was found that alterations had recently been made to certain points about halfway along the track and that the platelayers had made a perfectly sound bonding job to a diverging steam track. Thus, for part of the way, a return path was being made by way of the track rail-buffers—screen—building—earth plate, back to the main earth plate at the works substation (Fig. 2).—*A.C.*

Fault Checking

SIMPLE methods for checking the following faults are given below:—

(*a*) If a short circuit exists in a d.c. armature winding; (*b*) if a short circuit exists in the armature winding of a single phase repulsion induction motor; (*c*) the correct connections for the series winding in a compound wound motor; (*d*) the correct connections for the interpole winding in a shunt or compound wound motor.

(*a*) Remove all brushes so that there is no connection with the commutator. Energise the shunt field winding (if series wound pass approx. full load current through series winding only). Now rotate the armature by hand and if the armature rotates in jerks then a short circuit is indicated.

(*b*) Remove all brushes so that there is no connection with the commutator (make certain that the short circuiting plate or disc is quite clear of any part of the commutator). Energise the stator winding with single phase a.c. Turn the armature by hand and if a short circuit exists in the armature winding the armature will come to rest in one position and will require considerable force to move it from this position.

(*c*) Disconnect the series winding and run motor as a plain shunt wound machine. Note direction of rotation. Disconnect shunt winding and reconnect series winding. Place starter on *first* contact stud and note direction of

armature rotation. If this is the same as when motor was connected as a shunt machine then the series winding is correctly connected for operation as a compound wound machine. If rotation is opposite then interchange the ends of the series winding.

(*d*) Connect up machine (either series, shunt or compound, depending upon type) and note direction of rotation. Disconnect all fields except the interpole winding, which of course should be in series with the armature. Move the brush gear half a pole pitch in the direction of rotation. Place starter on *first* contact stud and note direction of rotation. If this is the same as before, when all fields were connected and brushgear in its normal position, then the interpole winding is connected correctly. If rotation is opposite then interchange the ends of interpole winding.

In the majority of cases it will be a fairly easy matter to make the foregoing tests as the separate series, shunt and interpole windings are connected to separate terminals in the connecting box on the machine.—*E. A. Robbins.*

Capacitor Lights Lamps

WHILST endeavouring to trace a fault that caused a 160 amp h.r.c. fuse at a small factory to blow twice within a few days the manager informed me that on each occasion of the fuse blowing the lights in his residence attached glowed dimly. The circuit was as shown.

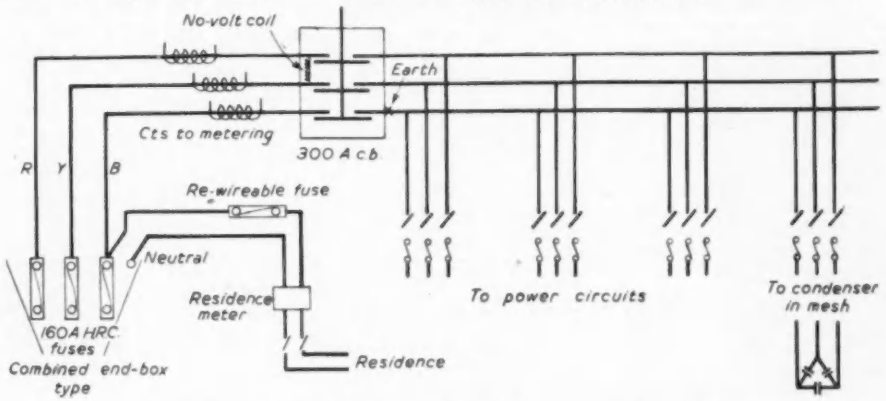
The fault, an earth (actuated by vibration) on the out-going side of the c.b. (blue phase) was found and appeared to have blown clear, but to be certain the side of the c.b. case was removed. Upon closing the breaker the effect of the lights glowing dimly in the residence with the blue fuse withdrawn still persisted. The megger showed all clear on both lighting and power circuits, so the various switches fed from the bus-bars were opened one by one and upon opening the switch controlling condenser the lights in the residence went out.

The no-volt coil of the c.b. was across the red and yellow and the condenser, controlled by a triple pole switch, fused 100 A h.r.c. was not fitted with no-volt release. Upon the blowing of the blue fuse the blue bus-bar was supplied via the condenser.—*A.E.C.*

Voltage Drop due to Out-of-Balance

DURING the winter a farmer complained of his lights decreasing in brilliancy at odd intervals of time. The farm was fed via overhead lines from a three-phase four-wire transformer situated some 400 or 500 yards away. A greenhouse was heated by some 22 kW of tubular heating, the load being balanced on all three phases and controlled by a triple-pole and neutral contactor. It was found that dimming of the lights only took place when the heaters were operating. Examination of the contactor disclosed that one of the line contacts had completely burnt out, thereby causing unbalancing of the system. Due to the long run of overhead line and the smaller section of the neutral wire, which under conditions of unbalance caused this out-of-balance current, an extra drop in voltage took place with consequent dimming of lights.—*P.E.G.*

Contributions to this page dealing with specific items of interest to electrical engineers and maintenance men are welcome, and, if accepted, will be paid for at our standard rates. Contributions should be written on one side of the paper only and may be accompanied by sketches, which will be re-drawn for publication.



Schematic circuit of house and factory wiring causing unusual effects

Canadian Fair features U.K. electrical equipment

BRITAIN'S greatest drive, so far, to win Canadian dollars begins on May 29 when the Canadian International Trade Fair opens in Toronto. No fewer than 800 U.K. manufacturers are taking part and almost every major British industry is represented.

The third of its kind, and 40% bigger than in 1949, this year's fair is the largest yet. A salient indication of current trade promotion in Canada is the large number of overseas exhibitors. In the electrical field the U.K. is especially well represented. Apart from the wide scope of British electrical equipment, the industry is making a special effort to capture orders which have hitherto gone to the U.S.A. Consequently, exhibitors have ensured that the quality and prices of their goods compare more than favourably with those from other countries. Delivery dates have also improved since last year and many U.K. manufacturers will supply from stock.

One of Britain's strongest selling campaigns will originate from the mammoth stand of the British tool, machine tool and scientific instrument section's display, where 250 machines will be in actual operation. Nearly 100 manufacturers, including several electrical, have taken space on the stand, which, covering an area of 35,000 square feet, will be the largest display of its type ever exhibited in Canada.

Visiting the trade sections in chronological order Britain's first electrical exhibit is found in the food products and produce group (No. 8). There PEERLESS AND ERICCSON (CANADA) LTD. show a selection of their powered food preparing machines.

In the iron, steel and non-ferrous metals group (No. 15), the TELEGRAPH CONSTRUCTION AND MAINTENANCE CO. LTD. display through their metals division some of the special magnetic, electrical resistance, and other alloys and metals they have developed for electrical engineering use.

For the business man seeking to improve his office equipment, the TELEPHONE MANUFACTURING CO., LTD., in group 16, offer telephone apparatus of all kinds, including inter-office and factory 'phones.

Although Canada has the largest national representation in the household appliances and musical instruments group (No. 18), three U.K. sponsored firms are represented. MORPHY-RICHARDS (CANADA) LTD. are showing a selection of their electrical appliances, irons, toasters and vacuum cleaners, all of which have been approved for the Canadian market. A newcomer to the Fair, J. AND H. WALTER, LTD., feature their "No-cord" electric iron and board, and hope to introduce an ozoniser to the market. Already a popular Canadian purchase, the Astral "baby" refrigerator is one of the strong points of TAYMOUTH INDUSRIES' stand.

British electrical manufacturers are making a strong bid through the electric tool, motors and supplies section (No. 19) and the supply engineer will find several stands of especial interest. BOWTHORPE ELECTRIC CO., LTD., and HELLERMANN ELECTRIC, LTD., show line jointing and binding accessories and STATIC CONDENSER CO., LTD., exhibit power factor correction capacitors and radio interference suppression devices. BRITISH INSULATED CALLENDER'S CABLES LTD. are featuring their well-known power capacitors of the paper-dielectric type, electric resistance welders, crane collector gear and trolley bus overhead fittings. B.I.C.C. h.v. and special purpose cables can be seen on the stand of Automatic Electric (Canada) Ltd. Through the newly-formed British General Electric (Canadian) Ltd., WOODS OF COLCHESTER LTD. are demonstrating the latest develop-

Desoutter hand electric drill

ment in axial flow fans, contra rotating impellers, as well as fans for various industrial applications. DAVID BROWN AND SONS (HUDDERSFIELD) LTD. are showing heavy equipment such as gear units and numerous applications of alloy, carbon steel, Taurus bronze and iron castings. Part of the exhibit of British Machine Tools (Export) Ltd. is being devoted to products of G. W. B. FURNACES LTD. Besides a 70 kW continuous steam electrode boiler and a 20 kW static model, the latest development of the company, an automatic electrode water heater can be seen.

DUBILIER CONDENSER CO. (1925) LTD. are also displaying power factor correction capacitors. Special cables (built to Government specifications) are featured on the stand of ENFIELD CABLES LTD.

The huge composite exhibit of the British tool, machine tool and scientific industry is in the machinery, engineering and plant equipment group (No. 20). Among exhibitors with space on the stand the CAMBRIDGE INSTRUMENT CO., LTD., are displaying instruments of a.c. and d.c. measurement ranging from their compact "Pot" galvanometer to the multirange "Unipivot." Manufacturers of braiding and electric cable making machinery, B. AND F. CARTER AND CO., LTD., are demonstrating their "London" braider unit. The world-famous small hand electric tools of DESOUTTER BROS. should prove popular to both large and small industrial buyers.

ELECTROTHERMAL ENGINEERING LTD. exhibit a wide range of heating apparatus and thermostats for the research laboratory and EVERETT, EDGCUMBE AND CO., LTD., feature electrical indicating and recording instruments. The firm hope to introduce their new "Vampire" a.c. test set and the Hum Metrohm 500 V d.c. insulation tester to Canadian buyers. On their stand KELVIN AND HUGHES (INDUSTRIAL) LTD. include an electronic temperature controller. A selection from their wide range of switchboard and portable electrical measuring instruments can be found on the R. B. PULLIN GROUP stand.

Five different types of electric furnaces, an electrode salt bath and an electric pottery kiln are being displayed on the WILD-BARFIELD ELECTRIC FURNACES LTD. stand and kW ratings have been designed to appeal to a large number of the light industrial users.

Carter's "London" braider

Outside the composite exhibit, but in the same section, FALK STADELMANN LTD. will be showing examples of their switchgear and high rupturing capacity fuses from 30-200 amp. One of ten ordered by the Hydro-Electric Power Commission of Ontario, a 2,000 kVA transformer made by BRUSH ELECTRICAL ENGINEERING CO., LTD., is among the five exhibits on the Brush (Canada) Ltd. stand.

Considerable research has gone into the various models of "Conveyancer" trucks being exhibited by ELECTRO-HYDRAULICS LTD. Since last year's Fair, the firm has developed equipment specially for Canadian requirements. On their large stand they are now including two 4,000 lb electric fork trucks on solid tyres with a 36-V, 480-amp/hr battery and a 2/3,000 lb truck with a 320-amp/hr battery. Battery chargers made by LEGG INDUSTRIES will also be exhibited.

SWITCHGEAR AND EQUIPMENT LTD. are to demonstrate some of their well-known switchgear, including an 11-kV pull-down fuse isolator fitted with a comparatively recent development, a rewirable liquid fuse rated 14/30 amp.

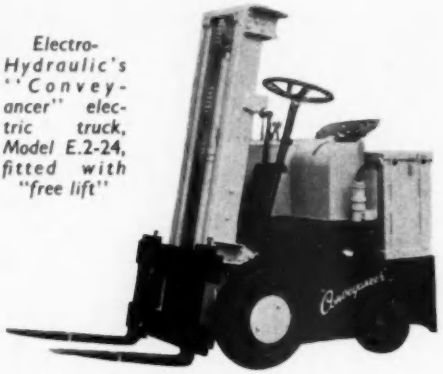
Left: Wild-Barfield electrode salt bath
Centre: 70 kW Autolec steam boiler
Right: Keith Blackman dust exhauster

KEITH BLACKMAN, LTD., who have just arranged to distribute in Canada through Vokes (Canada) Ltd., are showing several of their many "Tornado" fans. Industrial buyers will find a welding fume removing and a dust exhausting unit of interest.

On several stands the new range of electric motors by NEWMAN INDUSTRIES can be seen. Although not exhibited as a composite unit the motors will be driving British tools. Many British power tools in operation will be controlled by equipment made by BROOKHIRST SWITCHGEAR LTD. A special range of switchgear conforming to C.S.A. standards has just been approved.

Through the auspices of BEPCO CANADA LTD. three large U.K. electrical firms and their associated companies are showing selections of their motors, generators and transformers. In addition, CROMPTON PARKINSON LTD. are also exhibiting switchgear traction equipment and electrical instruments; LANCASHIRE DYNAMO AND CRYPTO LTD. variable speed drives, and BRUCE PEEBLES show synchronous condensers and magnetic equipment.

Again, on one stand—that of the Engineering Industries Association—three other electrical firms' products are featured. GEO. L. SCOTT AND CO. LTD. display motors, dynamos and accessories; LIGHTFOOT REFRIGERATION CO. LTD. are sh owing refrigerating machinery for all purposes; and PAINTON AND CO. LTD. offer electronic, communication and electrical components.



Electro-Hydraulic's "Conveyancer" electric truck, Model E.2-24, fitted with "free lift"

Canadian engineers will also have an opportunity of seeing copies of the *Electrical Times*—exhibited on the stand of the Periodical Proprietors' Association.

The Automotive Building, Toronto, where the Machinery Sections of the Fair will be housed, is shown on page 868.

Electric Vehicles and P.T.

THE shadow of purchase tax fell heavily over the annual luncheon of the Electric Vehicle Association last Tuesday. It was not lightened even when the virtues of electric vehicles were extolled by the Minister of Transport, the Rt. Hon. Alfred Barnes, M.P., in proposing the main toast, during which he successfully avoided raising this distasteful subject. He did, however, draw attention to the increased petrol tax and plead for research as to why more progress had not been made in electric vehicles.

We regret that Sir John Kennedy, president of the Association, was absent owing to ill health. His place was taken by Mr. Peter Rochs. It was he who replied to the toast, pointing out the skeleton of purchase tax which was present at the feast. He could not conceive that the Chancellor had intended to include electric vehicles under the new tax, but thought that they had been swept up in the general net. Speaking of exports, he said that the electric vehicle did not necessarily require a home market to support export sales, but the principal impediment to securing overseas orders were (1) that the house-to-house deliveries were not established practices in other countries and (2) the high initial cost of electrics. At home electric vehicles saved some 14¼ million gallons of petrol annually and required 120 million off-peak units from the B.E.A., providing the Authority with a revenue of £375,000 a year.

However, the Minister of Fuel and Power had paid a generous tribute to the electric vehicles, and the Co-operative movement, which owned 60% of all electrics, was vitally interested in seeing the purchase tax was removed.

Tornado in Bedfordshire

RADIO and newspaper reports of Sunday's freak storm in the Bedfordshire and Buckinghamshire areas gave the impression that heavy damage had occurred to overhead systems and that there had been widespread dislocation of supply. Through the courtesy of Mr. P. G. Campling, M.I.MECH.E., M.I.E.E., the manager of the Chilterns Sub Area (Eastern Board), we are able to give an authoritative report.

Overhead networks of the Chilterns Sub-area were subjected to the stresses of two distinct phases of storm conditions on Sunday, May 21, 1950, when electric storms of varying intensity circulated around the Bedfordshire and Buckinghamshire areas for several hours, the period of greatest intensity being from 16.30 hours to 19.40.

As a result of lightning, six transformers were burnt out, two 11 kV cable box breakdowns occurred and an 11 kV overhead line was brought down in the Bedford Rural district. These conditions combined with a wind storm of tornado velocity, which swept over the countryside in a quarter-mile wide lane from Wendover through Aston Clinton to Linslade and Leighton Buzzard.

In the Linslade-Leighton Buzzard area a 22 kV overhead conductor was torn from its insulator and, dropping over the cross arm, set up a sustained earth. The automatic reclosing mechanism, a feature of the new Sundon 22 kV switchhouse, proved invaluable under these conditions.

Latest reports indicate that following some 30 hours' continuous work all consumers were back on the line by Monday evening.

Research and Supply

Forty Years of Progress Reviewed by B.E.A. Research Chief

RESEARCH work by manufacturers and supply companies has helped to secure efficient operation of electrical power undertakings, since the earliest days of the industry, so MR. C. W. MARSHALL, B.SC. (ENG.), M.I.E.E. (B.E.A.: Deputy Ch. Engr., Research), found plenty to speak about when he lectured to the I.E.E. Supply Section on "A Review of Research in Electrical Supply" last week. He began with a survey of the Scottish electrical supply undertaking with which he was associated in 1910 (1·5 MW boilers, 3 MW alternators, 6·5 kV cables), pointing out that though based on Lord Kelvin's principles it had many practical shortcomings. At a later date, when Sir Archibald Page reviewed the system he decided that lessons learned on the Tyneside companies must be applied, and so research results at an early date replaced wholly theoretical conclusions.

On the Tyneside C. L. Merz and his associates had studied every phase of power supply in a systematic series of researches which were conducted mainly on the generating stations and transmission systems, though laboratory investigation backed this up where necessary. This work, resulting amongst other things in the acceptance of a three-phase earthed neutral system as standard, laid a foundation for electrical supply which has stood the test of time, few changes from Merz's ideas being necessary. By 1920, boilers had reached 5 MW, sets 20 MW, stations 100 MW in size, and the transmission voltage had been raised to 33 kV. In the course of the development leading to these figures two disquieting facts had appeared. Firstly, even well-constructed circuit-breakers sometimes exploded when opening on faults, and secondly, every upward step in voltage brought increased trouble due to insulator flashover and puncturing. The solution of such problems was one of the jobs for which the E.R.A. was founded in 1919.

The C.E.B.

The next major step in supply development was the establishment of the Central Electricity Board in 1926, but it had to be borne in mind, emphasised Mr. Marshall, that the Board was neither called on nor empowered to conduct research. It could only call for it in relation to specific problems. So soon as the Grid got going, trouble arose with fog and atmospheric pollution, although the C.E.B. had allowed for more than 20% additional insulation as a margin for contingencies. The first Glasgow fog of 1929 caused a frightening number of flashovers, and later serious problems arose in Manchester, Bradford and near the Thames Estuary.

This serious situation was, by the application of research, solved at comparatively little cost. C.E.B. research on outdoor insulators was continued, and it now seems that the solution is to maintain a steady voltage gradient by means of conducting glaze for all big shells of porcelain. For cap and pin insulators the problem is still unsolved, and indications are that 300 kV is the maximum possible voltage for this design in Great Britain. A second crisis occurred in connection with the Post Office lines and voltage induction troubles but this was also overcome.

Transformers

Surge phenomena attracted much attention at one time, as in the early days of the Grid there were a series of transformer failures which were attributed to this cause, three different makes of transformer being involved. Eventually it was found that weak design points not shown up by steady voltage testing were the cause, and correction proved to be relatively simple and inexpensive. Gradually all types of transformers are being tested for their ability to withstand surges, and an investigation is proceeding into the surges which must be withstood. However, as far as flashovers were concerned, 16 years of study had only produced the alleviating measure of using reclosing circuit-breakers, a drastic and expensive practice.

Circuit-breaker research had kept pace with the requirements of increasing fault powers, and work in this field was the greatest achievement of manufacturing research in the last 20 years. A problem which remains largely unsolved was that of aluminium corrosion on overhead lines. There was an opportunity for metallurgists and corrosion experts to do some development of national importance in this field.

At present, the greatest technological and scientific effort had to be expended in raising

the efficiency of generation, and well-planned schemes were in progress which should raise efficiency to 26%. In such an advance odd jobs were continually coming into the research category, and to deal with some difficulties on the fuel side the B.E.A. has joined the British Coal Users' Research Association, which had a staff of over 200 workers. On a smaller scale work was being done for the hydro-electric stations by the British Hydromechanical Research Association, which also had connections with the leading pump manufacturers. Further liaison with a view to helping constructional methods had come from membership of the British Welding Association.

In addition to this membership of associations able to undertake long-term work, the Authority had always considered it essential that it should be able to undertake certain "first-aid" investigations itself. In this respect power stations and transmission systems had to be regarded as the proper place for large-scale investigation.

Cooling Towers

An example of the first-aid work intended occurred in connection with precipitation from cooling towers. Here the position was much the same as that of oil circuit-breakers 30 years ago; little was known of the basic theory of cooling, and only when the public complained was much notice taken. As full-scale work was inordinately expensive it was necessary to proceed with models 1/2,000 full size. It seemed that the answer to the problem would repay the investigational costs many times over by the increases in fuel economy that it would produce.

In all research work the liaison effected with the best type of scientific mind through the Electricity Research Council was an important factor in economy. Proposals such as those to modify thermal cycles could be critically vetted without the expense of testing by building a plant, as had often been done in the past.

Finally, Mr. Marshall mentioned as a possibility the halving of clearances on high voltage lines as a result of good insulator design based on extensive research into the dielectrics used. The cable manufacturers had examined their materials far more intensively than had the insulator makers. At still higher voltages, with reference to d.c. transmission, he thought that tests on a larger scale than the laboratory should be carried out, for connection with a Western European Grid could be effected more safely from the cable point of view if d.c. were used.

Universities and the Manufacturer

LAST November delegates from the universities and university colleges of Great Britain and from industry, met in what is believed to be the first conference of its kind, and spent three days in the discussion of matters of common interest. The meeting was organised by the Education and Industrial Research Committees of the F.B.I., and a report of the proceedings has now been issued. (Obtainable from 21 Tothill Street, S.W.1, price 3s.)

No formal resolutions were passed by the Conference, but there seemed to be wide support for several recommendations which were made by individual delegates, and the first of these was that a much greater supply of information should be made available by industry concerning its make-up and requirements of graduates.

In general, the value of vacation courses was well recognised, and it was pointed out that the present schemes might be extended to make provision for the arts student who wished to learn something of the inside of industry.

No definite decision seemed to be reached on the subject of post-graduate courses, but there was a trend towards the idea that a one-year course, not necessarily for a higher degree, would often be preferrable to a two- or three-year course leading to a PH.D. In connection with the whole problem of the shortage of science graduates, the insidious effect of the present shortage of science teachers was noted. The F.B.I. was asked to consider whether there was any useful action it could take to assist in increasing the supply of science teachers for schools.

Finally, it was proposed that the F.B.I., in conjunction with the University Grants Committee, should organise a small team to visit the U.S.A. to study the relationship between American Universities and industry, to see whether, and if so to what extent, this relationship was connected with the high productivity of American industry.

Illuminating Engineers at Buxton

The I.E.S. Summer Meeting

DR. J. N. ALDINGTON presided over the summer meeting held by the Illuminating Engineering Society at Buxton last week. The proceedings commenced with a civic reception on the Tuesday at the Pavilion, Buxton. Other social events included the Don Golf Cup, a tour of the Derbyshire dales, and a visit to Haddon Hall, and the presidential reception.

The technical session was opened by a popular lecture on "Visual Deception," given by Dr. L. A. Sayce, M.Sc., Ph.D., F.R.I.C., of the National Physical Laboratory, who, as a camouflage expert during the wartime, had a very considerable experience to draw upon.

Floodlighting

Floodlighting was the subject of a paper given by Mr. R. O. Ackerley, M.I.E.E., F.I.E.S., who commenced by pointing out that owing to the war, a generation of lighting engineers had grown up without knowledge or experience of the techniques involved, while the older generation might well need a refresher course.

From the technical standpoint, light control was of primary importance, and the paper reviewed the methods in use, and the technique of building up light over an area, with a section on the basic necessities of equipment, laying stress on good optical design, mechanical robustness, ease of focusing and training, heat dissipation, watertightness, and easy maintenance.

A knowledge of the engineering aspects of floodlighting and of normal illumination practice would enable any competent lighting engineer to design a scheme for purely utilitarian purposes, but more was wanted for successful "spectacle" floodlighting; there was the artistic aspect to be considered. This section of the paper dealt with the direction of the main lighting, the necessity of supplementary lighting and such items as concealment, floodlight selection and the use of colour. Recommendations were given of illumination values for various types of buildings, nature and condition of surfaces and surround brightness. A typical installation, that originally installed at Buckingham Palace, was then analysed.

The final section dealt with other floodlighting applications, such as advertisements, gardens, fountains, and statuary, and for utilitarian purposes such as swimming baths, sports fields and industrial concerns, including railway yards, quarries and pitheads.

Light on Textiles

"Lighting of Fibre and Fabric," by H. Hewitt, A.M.I.E.E., M.I.E.S., reviewed the application of artificial illumination in the textile and clothing industry. Visual tasks were compared in the cotton, wool, silk and rayon, linen, and clothing industries, all of which present different problems. For example, on some, a good general lighting will suffice, while in others, special consideration of the location of the light fixtures is necessary to avoid specular reflection. Others, such as the clothing industry, may require a high degree of colour discrimination.

The illuminating engineer has played a considerable part in the increased efficiency of many textile industries. Recommended intensities vary considerably, 7 l.s.f. being sufficient for such operations as carding of cotton, while weaving requires from 10-30 l.s.f. according to colour and count. Light sources most frequently used are tungsten and hot cathode fluorescent tubes, although cold cathode installations have been used, one modern nylon factory being illuminated to an average intensity of 30 l.s.f. by nearly 1,000 triple-tube units.

Two interesting points made with regard to fluorescent lamps were the absence of trouble due to stroboscopic flicker, even when twin-lamp circuits were not used, and the high maintenance costs due to the length of time required to diagnose faults, as compared with tungsten lighting.

Special applications of light to quality control include the use of stroboscopic lamps for inspecting cloth printing processes; special high intensity lighting for revealing weaving faults; accurate colour matching; and the use of gas arc lamps for accelerated fading tests.

The paper also included a brief review of lighting from the display viewpoint.

Lighting in Sweden

Dr. Ivar Folcker, President of the Swedish Illuminating Engineering Society, gave an address on lighting in his own country.

Though steps have been taken in the last year or two to initiate original work on lighting in Sweden, there is little at present that does not owe much to developments in other countries,

chiefly Great Britain and the U.S.A. It was not until 1926 that serious attempts were made to make available general information on the principles of good lighting and to consider possible future developments.

The introduction of the fluorescent lamp has roused further interest in lighting as it has in most countries. Lighting engineers in Sweden are facing the problem of glare caused by poor design of fittings and installations using these lamps. Attention has also been given to the design of suitable fittings for use in homes where, though home lighting accounts for about 60% of the total lighting load, the standard of lighting in comparatively low.

Light for the Theatre

The paper "Stage Lighting in the Post-War Theatre in Great Britain," by Mr. L. G. Applebee, F.I.E.S., gave an interesting picture of this highly specialised branch of the lighting art, including a review of the different types of equipment and their functions, with lighting layouts for typical plays.

The size of stage lighting equipment is indicated by the connected loads which vary from 200 kW at some medium-sized theatres to 656 kW for the London Palladium, and 850 kW for the Royal Opera House at Covent Garden. These are, however, dwarfed by such loadings as the Roxy Theatre and Radio City Music Hall in New York, whose loadings are 2,500 and 3,150 kW respectively.

The control of such loads and the large number of circuits was briefly dealt with, including the use of resistance dimmers and saturable reactors, but the trend of electronic dimmers in this country was towards the use of direct operation of lamp banks from groups of thyratrons, control being by grid potentiometer.

Street Lighting

Mr. J. M. Waldram, B.SC., F.Inst.P., F.I.E.S., presented a paper on "The Development of Street Lighting in Great Britain," in which he commenced by tracing the history of street lighting from the earliest days. In the 1920's, street lighting was regarded, as it had been for many years, as a matter of getting as much light on to a working plane as evenly as possible. Considerable impetus was given by three things: the appearance of B.S. 307 in 1927, the International Illumination Commission's meeting in the U.S., and the work done by J. F. Colquhoun as president of A.P.L.E. in 1928. During the next three or four years rules of good practice were emerging; the effects of the road surface and the phenomena of visibility were being studied. The emergence of the discharge lamp in 1932 had been a most significant development, although the difficulties involved with the early vertical-burning lamp were considerable.

In 1934, a fresh approach was made, this being based on brightness rather than illumination values and a consideration of the problem as being based on three-dimensional geometry, instead of on simple plans. This period culminated with the work of the Ministry of Transport Departmental Committee, whose report has since been taken, in effect, as the code of practice for this country.

The principal object of a designer nowadays is to provide fairly high and fairly uniform road surface brightness, which silhouettes objects, achieving this with as little glare as possible. Modern systems may be divided into four classes: the *non-cut-off* with high intensities up to about 85°; the *semi-cut-off* which maintains the intensity up to about 80°; the *cut-off*, where there is a sharp fall in intensity at about 70-75°; and the *unidirectional*. Examples and diagrams were shown of all four systems.

The paper concluded with a brief review of modern lantern designs, and some of the important outstanding problems, such as the lighting of residential roads and the maintenance—and control—of street lighting in general.

I.E.E. Measurements Section Conversazione

PROFESSOR J. GRIEG, M.SC., PH.D., and MRS. GRIEG received members and guests at the Measurements Section Conversazione, held on Tuesday of last week, the hall of the Institution building being transformed for the occasion with an illuminated fountain.

Several interesting exhibits were demonstrated by research establishments and by the Institution, including a collection of historical measuring instruments; magnetic fluid clutches; a clock incorporating a magnetic escapement; a model illustrating parasitic forces in watt/hour meters; and demonstration of fluorescence under ultra-violet light. Many of the demonstrations were arranged to appeal to the non-technical guests—there was, for example, a relay counting device which was arranged in the form of a game in which several lights were switched off alternately by the player and the machine, the object being to leave the machine to switch off the last light. It is hardly necessary to relate that the machine always won.

This, the first Conversazione to be held by the Measurements Section, was unanimously voted a great success, and it is hoped that further events of this type will be held in future years.

Aldermaston Laboratory

A.E.I. establishment devoted exclusively to fundamental research

THE fact that works research laboratories are primarily engaged on the solution of technological problems makes them generally unsuitable for use on all but a small portion of fundamental research. In view of the importance of the latter, both to science and industry, the A.E.I. Group has established a laboratory devoted exclusively to fundamental research at Aldermaston Court, 10 miles west of Reading.

Spacious and ample accommodation is available in the main building, and several temporary war-time Air Ministry buildings erected in the grounds have been utilised. The total floor area available for research is 82,000 sq ft, and a staff of 180, including physicists, engineers and metallurgists, is now employed. A laboratory training school is attached.

Work Being Done

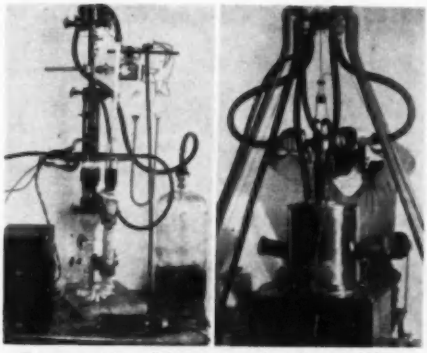
Most of the work being undertaken deals with nuclear physics and semi-conductors, although other items include electron microscopy, field plotting, and metallurgy.

The general physics section, under Dr. E. Billig, is mainly interested in the mechanism of electrical conduction in solids, particularly in semi-conductors such as germanium silicon, selenium, etc.

In the nuclear physics field a 500 kV d.c. electrostatic Van der Graaf-type generator has been installed, and a 4 kV generator is under construction. Detectors for charged particles and measurements of energy of high velocity particles are other items for research work.

Metallurgical research is aided by a new arc melting furnace, which can deal with highly reactive metals, and an induction furnace outfit powered by a 35 kVA motor-generator set producing a frequency of 10 kV.

Work is also being carried out on surface phenomena.



Two examples of the work undertaken at Aldermaston; left: a crystal growing set, right: a new arc furnace for metallurgical research

overseas news

Sweden's Capacity

The installed capacity of Sweden's power station totalled 3,010 MW at the end of 1949, E. Blomquist disclosed in his address before the annual meeting of the Swedish Water Power Association, last month (incidentally the Association was celebrating its 40 year jubilee). Plant totalling more than 1,500 MW was in course of construction, the largest station being Harsprangek, which was to be of 290 MW. The first unit in this station was planned to be in operation next year.

Australian Firms' Problem

Strong opposition to the Federal Government allowing the duty-free importation of prefabricated homes completely fitted with electrical equipment, was expressed by Mr. R. J. W. Kennell, president, at the inaugural Australian Electrical and Telecommunication Industry Convention, to which we briefly referred last week. He was speaking at the gala luncheon; subsequently the sectional committees unanimously endorsed the objections, although agreeing to the necessity for importing houses. Several serious problems confronted the industry, Mr. Kennell said. One of the most difficult was the flooding of the Australian market with imported electrical goods. Australia had become the greatest purchaser of British electrical and other goods, and while appreciating the job done by Britain and the magnificent struggle during the post-war years, they could not permit that state of affairs to continue. It was now a question of self-preservation, for if they looked around they could see all the shops selling electrical appliances imported from Britain. It was alarming to think that the country's financial reserve had increased from £5 million in 1939 to £555 million this year, and that goods must be bought from Gt. Britain to counteract that reserve. It was stupid to allow duty-free goods to go into Australia when the apparatus could be supplied by local manufacturers, he considered. If the Government could subsidise coal and steel imports, why not do likewise for the Australian made electrical appliances if the local costs were too high? he asked.

Extensions at Newcastle

Earlier this month, Newcastle City Council, N.S.W., decided to place orders immediately for equipment needed to supply electricity to Courtauld's proposed rayon factories at Tomago. Total cost is estimated at £60,000. The Council's electric supply department is seeking permission to borrow £370,000, urgently, of which £140,000 is estimated capital expenditure for the last six months of this year, and £150,000 for the first six months of 1951. Mr. Nash, the acting electrical engineer and manager, had reported that the department had found it necessary to hold up the issue of orders covering rural extensions and other important projects.

That N.S.W. Bill

Local government in New South Wales was fundamentally opposed to the State's Electricity Commission Bill because it meant the transfer of more powers from local bodies to central authority. So declares the Local Government Association in its latest statement. It is pointed out that in the Bill it was proposed to give the Commission power, with the concurrence of the Minister, to arrange for power supplies direct to large consumers, irrespective of the wishes of the local council. In other words, the Commission could "pick the eyes" out of the retail business, leaving domestic and the more costly supplies to be handled by the councils, the Association alleges. The Commission could, with the consent of the local council, supply direct to any private person, and this applied even where a council was a constituent of a county council—including the Sydney County Council, St. George, and the Southern and Northern Riverina County Councils. These powers could mean, in the hands of an unscrupulous Minister, progressive strangulation of the Sydney County Council and other county councils—even as distribution authorities, the Association considers.

New Guinea Development

The Australian Government has decided to form, in conjunction with the British Aluminium Co. Ltd., a company to be known as the New Guinea Prospecting Co. Ltd., with a nominal capital of £100,000, whose object will be the location and development of large-capacity hydro-electric power schemes suitable for use in industry, particularly aluminium. Prospecting surveys will also embrace searches for bauxite and other minerals.

Electrification in Canada

A total of 86% of Canadian households are now served with electricity, according to an estimate based on a statistical sample taken by the Dominion Bureau of Statistics. Out of 3½ million households in Canada, 3 million have a supply, the survey calculates; there remaining only 502,000 households as a potential market, most of these being in farm areas. A total of 364,000 out of 725,000 farm households were still without electricity. In small urban centres only 23,000 homes or 3% of households in these centres are not yet elec-

trified, according to the estimate. Other non-farm homes outside metropolitan areas account for 109,000 non-electrified households, however. These are 21% of their class. Canada's metropolitan centre is considered to be 100% electrified. In the present electrification picture, the survey shows, 48% of Newfoundland households are electrified; 43% of Prince Edward Island's; 86% of Nova Scotia's; 80% of New Brunswick's; 94% of Quebec's; 94% of Ontario's; 71% of Manitoba's; 54% of Saskatchewan's; 63% of Alberta's; 96% of British Columbia's.

Tidal Scheme

Engineers of the Canadian Federal Government arrived in Moncton, New Brunswick, earlier this month to conduct a survey of the St. Mary's tidal power development scheme on the Petitcodiac River. They will report back to Ottawa on whether the plan will bear further consideration after visiting the scene of the proposed project.

Licensing in Ontario

At the recent meeting of the Zone 1 of the Electrical Contractors' Association of Ontario, it was reported that the Provincial executive had been advised to defer their application to the Ontario legislature for a provincial licensing Bill until later this year or early 1951, in order that the scheme should not be prematurely presented before any difficulties had been eradicated.

E. London's New Station

Tenders for a portion of the plant for the first section of East London's new power station were under consideration, said Mr. A. Foden, manager of the Border undertaking of the Electricity Supply Commission of South Africa, earlier this month. It was planned to have the first section in commission by 1955, the station having an ultimate capacity of 100 MW. It was hoped that, when conditions became normal, the Electricity Supply Commission's planning, which was to link up East London (and westwards) with King William's Town, Alice, Fort Beaufort, Adelaide and Bedford northwards from King William's Town through the Izeli Valley, corporating Blaney, Kei Road, Stutterheim and Cathcart, would materialise, he said. The proposed transmission line would operate at 66 kV.

Stanger H.E. Scheme

Members and officials of the Stanger Town Board, this month investigated the progress being made on the town's £100,000 hydro-electric scheme, on which work started in 1949. Satisfaction was expressed at the project keeping abreast of the construction schedule. A 730 ft weir, which in one place will reach a height of 35 ft, is being thrown across the Umvold River to maintain river height for diverting water through a 3,000 ft long tunnel to the station. The latter will house two 500 kW turbines, which were ordered from England, and are expected to reach Stanger early next year.

New Zealand's Predicament

Because the amount of water available for generation decreased still further during recent weeks, the State Hydro-Electric Board of N.Z. has now asked all undertakings in the South Island to reduce their demands by another 10% at least. Mr. A. E. Davenport, general manager of the Department, stated that unless there was a rapid improvement in the water position even heavier restrictions will become necessary. To assist, the broadcasting service has been closed down at 10 p.m., and it has been suggested that all commercial consumers should not use window lights up to 6 p.m., and switch off neon signs, while industrial consumers should curtail consumption for lighting. Reviewing the South Island situation, Mr. Davenport stated that at the conclusion of the five weeks since the reduction of power consumption was first ordered, the demand had come within the allotted figures, but the period included Anzac Day. The other side of the picture was not good. It had been necessary to take nearly 6,000,000 units from storage in spite of the reduced consumption. That position was due to the rapid decrease in the amount of water available. The Waitaki River flow had fallen from 62% of the average at the middle of April to 36% of the average for last week's. In the North Island too, the position is acute. At this month's meeting, the Auckland Harbour Board, reported that to achieve the saving of power required it would be necessary to reduce the use of cranes and carry out more work with ships' gear. 68% of the Board's consumption is for power.

Malaya Import Tariff

Under regulations just made by the Federation of Malaya, the new rate of import duty of 15% *ad valorem* is applied to domestic electrical appliances such as kettles, irons, toasters, etc., but cookers and lighting equipment are not affected. The opportunity has also been taken to rectify certain anomalies in the customs tariff. In the past, complete wireless receivers were only dutiable at 5% full duty and free preferential, while radiograms, parts etc. were chargeable at 30% full duty and 25% preferential. The tariff has now been consolidated at 20% full duty and 15% preferential in respect of all these articles.

Venezuela's Plan

Studies have now been completed for the three proposed generating stations on the River Caponi, Venezuela, which are planned to have installed capacity of 300 MW, 150 MW and 50 MW, but further investigations are to be made before any decision is taken. These stations would be located adjacent to the gold and diamond mining area and the new ironfields.

PERSONALITIES

IN THE INDUSTRY

After spending a few weeks in Canada, during which time he visited the St. Catharine's plant of the English Electric Co. of Canada, and other factories, **Sir George H. Nelson,** M.I.E.E., chairman and managing director of the English Electric Co., Ltd., returned to this country last weekend.

To many in the electrical industry, particularly on the electric heating and water heating side, **Mr. P. A. Bailey** is already well known—he has been sales manager of Heatrae, Ltd., of Norwich, for the past 13 years. We hear that he has now been appointed sales director with the firm. Mr. Bailey, by the way, served with Central London Electricity, Ltd., before joining Heatrae in 1937.

London Transport has appointed **Mr. A. T. Wilford,** B.SC., A.R.C.S., F.R.I.C., C.I.Mech.E., F.Inst.Pet., as director of research. He entered the service of the former Underground companies in 1920 as chemist with the London General Omnibus Co., becoming chief chemist in 1926, a post which he continued to occupy under the L.P.T.B. In January, 1949, he was appointed Superintendent of Laboratories in charge of the Central Laboratory at Chiswick, and the three generating station laboratories.

Formerly resident electrical engineer and manager to the Hebden Royd U.D.C., and now with the Yorkshire Electricity Board, **Mr. H. H. Sutcliffe** has been elected a councillor in the Hebden Bridge Ward of Hebden Royd.

Mr. Harry L. Dowsett, chairman and managing director of the companies in the Dowsett Group, left London for Australia in the *Strathmore* recently to visit Dowsett Engineering (Australia) Pty. Ltd., the Australian subsidiary company, in connection with the further development of business in Australia, where the company is engaged on civil engineering projects and opencast coal mining. Mr. Dowsett is expected to return to England in the latter half of July.

Mr. R. P. Bell and **Mr. J. Kirkpatrick** have been appointed to the board of Berry Wiggins and Co. Ltd. Mr. Bell has been technical adviser since 1946, while Mr. Kirkpatrick has been personal assistant to Mr. R. C. Paterson, director, for about four years.

Previously assistant electrical engineer at the Manor and Bankfield Works of Joseph Sankey and Sons, **Mr. H. H. Wright,** A.M.I.E.E., has been promoted to chief electrical engineer there. His early training and experience was gained at Norwich Technical College and with Laurence, Scott and Electromotors, Ltd.

R. W. Gregory and Partners have opened a new office at Regent House, 30 Cannon Street, Manchester, with **Mr. S. Jewsbury,** B.SC., A.M.Inst.C.E., A.M.I.H.V.E., as their resident partner.

At the recent dinner held to commemorate the golden jubilee of the Watford Electric and Manufacturing Co., **Mr. H. J. Norballe,** senior director and founder of the firm, was presented with a television set from the employees as a mark of their esteem. Presentations were also made to all employees who had served 25 years or more with the firm.

The South Counties Area Manager of Bill Switchgear Ltd., **Mr. W. L. White,** has changed his address to 94 Shakespeare Avenue, Bath. Telephone, Bath 3423.

Harrow district engineer, Eastern Electricity Board, **Mr. A. Durbridge,** has been elected a governor of Harrow Technical College.

Mr. S. Hutchinson, assistant manager of the Stamford District, East Midland Electricity Board, has been elected president of the Stamford Chamber of Commerce for the ensuing year.

Mr. R. T. Wilson, an old Sunco employee and late of Crompton Parkinson, Ltd., has returned to the Sun Electrical Co., as sales representative and is taking over the South West London and East Surrey area in the place of **Mr. E. V. N. Bell.**

Site investigations engineer of the North Western Division of the B.E.A., **Mr. W. R. Allcock,** M.I.E.E., M.I.Mech.E., has recently retired after 40 years' service in the Electricity supply industry—38 of them with the former Stockport Corporation undertaking. He commenced at the Stockport power station as an articled pupil, and rose to the position of chief engineer and manager in 1944. Upon the formation of the B.E.A. he was appointed executive officer for Stockport, and later site investigations engineer for the Division. Mr. Allcock took a major part in the recent extension at the Stockport generating station. This work extended over a period of 15 years, during which time the old plant was stripped out and new plant installed.

Mr. W. R. Allcock

Manager of the Ipswich branch of the General Electric Co., Ltd., for the past 32 years, **Mr. F. Crush** will retire at the end of next month. He joined the G.E.C. in 1909, working at Queen Victoria Street under the late Mr. J. Y. Fletcher, a director of the company and manager of the Osram Lamp Department. In 1911 he was appointed manager of the lamp section of the trade counters and two years later became responsible for the running and co-ordination of all counters and the showrooms. He passed through various other departments at Head Office before leaving in January, 1918, to open a sales office in Commercial Union Buildings, Ipswich. This grew in stature under the guidance of Mr. Crush and in 1929 was given the status of a branch with premises in Westgate Street. It is no small tribute to Mr. Crush that the branch, now at Electric House, Lloyds Avenue, with additional premises at Brooks Hall Road, has become such a flourishing concern.

Mr. F. Crush

In succession to Mr. A. K. Nuttall, who recently transferred to Newton Victor, Ltd., **Dr. L. W Brown,** B.SC., PH. D., A.M.I.E.E., has been appointed chief engineer of the radio department of the Metropolitan Vickers Electrical Co., Ltd. Dr. Brown has been with B.T.H. since 1943, where in the electronics engineering department he has been responsible for radar development. Technically educated at King's College, University of London, he graduated with special honours in physics in 1934, and two years later received his Ph.D. for work under Professor Appleton on radio pulse investigations of the upper atmosphere.

Dr. L. W. Brown

Resigning from the cable section of the Supplies Division of Crompton Parkinson, Ltd., **Mr. H. Young,** is going into business on his own account, under the style of H. Young and Co., at St. James's Street, Brighton, as a manufacturers agent for all types of conductors. He has had considerable experience in the cable-making industry, and in the early 20's during the boom years of radio, was manager of the Wireless Department of Edison Swan Electric Co.

To fill the post of chief assistant electrical engineer in the Essex County Architect's Department, **Mr. H. G. Blackford,** A.M.I.E.E., has been promoted from senior assistant electrical engineer there.

Earlier this month, **Mr. R. F. Bellamy,** M.I.E.E. of the British Insulated Callender's Construction Co., Ltd., arrived in Uganda to take up duties as chief engineer and manager of his company's Kampala office.

Ekco-Ensign Electric, Ltd., announce the appointment of two new representatives in the London area. They are **Mr. R. K. Taylor** and **Mr. W. Gray.** Both will be based on the company's London office at 5 Vigo Street, W.1. The firm has also appointed **Mr. H. J. Owen** as another representative based on the Preston depot.

Mr. Ian M. Stewart, B.SC., son of the late Sir Frederick Stewart, has been appointed chairman of Thermotank Ltd.

OBITUARY

We learn with regret of the death at Durban on May 9, from malignant cerebral malaria, of **Mrs. N. Reddyhough,** wife of Mr. H. L. Reddyhough, A.M.I.E.E., M.INST.F., whose retirement from the position of chief engineer to the Gourepore Electric Supply Co., West Bengal, we noted only a few weeks ago. Mr. Reddyhough is returning to this country in the *Winchester Castle*, leaving Durban today, May 25.

The death occurred on May 13 of **Mr. C. C. Stoodley,** aged 49, who for several years had been general works manager of the Hotpoint Electric Appliance Co. at Peterborough, and other concerns. He had latterly been associated with the British Thomson-Houston Co.'s branch in Blackbird Road, Leicester, and was recently appointed director of manufacture with that company.

The death occurred recently of **Mr. W. J. H. Penman,** A.M.INST.T., who was transport manager with Darlington Corporation for 13 years.

Joint founder of the Birkenhead firm of W. H. Trace and Son, electrical contractors, **Mr. William Henry Trace** died last week, aged 77.

We note the death on May 22 of **Mr. N. P. Bedson,** B.SC., A.M.INST.C.E., M.I.E.E., who was chief engineer to Richard Johnson & Nephew, Ltd., at Bradford Ironworks, Manchester, for some years. Educated at Manchester Grammar School and Victoria University, Manchester, he served an apprenticeship with the British Westinghouse Co. at Trafford Park, and later spent some time with Siemens-Schuckertewerke at Berlin and Liege.

We learn of the death, on May 19, of **Mr. D. Wilson,** O.B.E., A.M.I.E.E., F.INST.F., who at one time was head of the testing department and general sales manager to Babcock & Wilcox, Ltd., and was general sales manager to International Combustion, Ltd., from 1924 to 1933. From 1892 to 1904 he was superintendent of the Bankside station of the City of London Electric Lighting Co., Ltd.

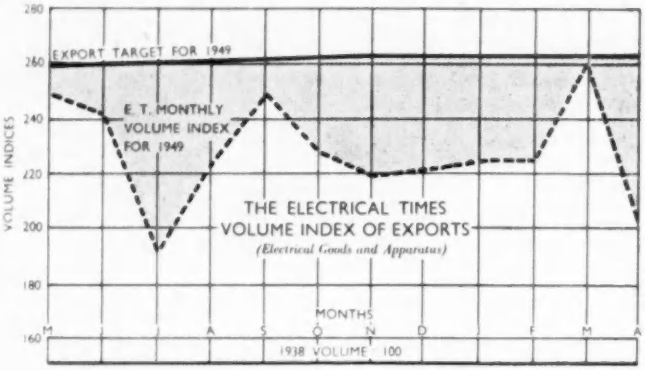
Wills.—**Mr. H. G. Shoolbred,** founder and director of the Shoolbred Electrical Co. Ltd., left £8,725 (£8,104 net value).

Mr. J. W. Smith, chief buyer for Electrolux Ltd., left £10,038 (£9,668 net value).

EXPORTS AND IMPORTS

EXPORT VOLUME INDEX

Trade returns for April show that £5,793,072 was the value of the electrical goods and apparatus exported during the month. This is equivalent to 204 per cent. of the 1938 achievement, a low figure that is largely explained by the occurrence of the Easter holiday during the period. In the circumstances it is not surprising that results fell far short of the most recent export target figures available.



WITH the intervention of Easter holidays, and the reduction of working days in April to only 23, the trade figures were correspondingly lower, the exports of all electrical goods dropping £2,731,416 below the high figure for the month of March. The reduction was spread fairly evenly over most goods, although slight increases were recorded for such items as batteries, accumulators, and house service meters. Of all the cooking and heating apparatus exported during the month, complete cooking appliances accounted for £108,457 of the total value, heating appliances £37,301, and electric irons £30,496. Electric motors of between one and 250 h.p. to a value of £400,891 were exported in the period, the corresponding figures for those of from ¼ to 1 h.p. being £33,530 and up to ½ h.p. £61,667. Last month, Australia took electrical goods valued at £1,341,830, India took £928,567, South Africa £619,514, New Zealand £329,710, and Canada £178,581.

Description	Exports Value Month of April			Imports Value Month of April		
	1948	1949	1950	1948	1949	1950
	£	£	£	£	£	£
elegraph and Telephone Wires and Cables—						
Submarine	93,607	68,213	27,144			
Other	661,685	536,198	592,553	13,634	6,292	15,186
Rubber Insulated	399,252	455,759	202,180			
Insulated, other than Rubber	915,058	981,551	603,349			
Wireless Apparatus, including Valves	1,112,012	949,483	992,790	53,309	56,799	122,871
Telephone and Telegraph Apparatus	925,978	1,216,593	1,411,283	8,129	7,302	5,155
Electric Lighting Appliances, Accessories, Fittings and Parts:—						
Bulbs and Discharge Lamps	106,507	135,599	98,430	5,617	10,299	14,867
Other Descriptions	369,247	374,197	283,990	24,511	3,436	14,042
Batteries (primary)	42,806	84,819	98,568	—	—	—
Accumulators, Portable	263,779	226,743	247,361	—	—	—
,, Stationary	52,034	52,824	80,901	—	—	—
,, Parts and Accessories	54,727	96,070	62,644	—	—	—
Electrical Cooking and Heating Appliances	288,559	249,210	215,215	—	—	—
Ammeters, Voltmeters, etc., and Parts	83,280	93,707	107,792			
House Service Meters	202,916	130,199	55,579	33,410	24,352	42,100
All Other Instruments	88,372	74,523	114,367			
Electro-Medical Apparatus	25,675	30,976	34,297	—	—	—
X-Ray Apparatus, etc.	69,020	57,235	44,584	58,385	48,011	53,977
Insulating Materials	146,795	122,343	147,685	—	—	—
All Other Articles	300,043	423,173	378,360	102,848	53,913	95,183
TOTAL OF GROUP	6,255,568	6,359,415	5,793,072	299,843	211,404	363,381
Electrical Machinery:—						
Generators (not exceeding 200 kW)	185,348	811,706	564,384			
,, (exceeding 200 kW)	154,821	230,588	189,495	83,639	12,061	35,137
Parts	135,948	60,945	139,885			
Motors	581,397	818,203	622,330	24,078	30,879	32,698
Convertors, Transformers, Rectifiers, Motor Control Gear, Switchgear, other machinery	938,369	1,314,646	1,447,052	14,525	10,310	11,111
Fans, Electrically and Power Driven	84,507	120,013	107,124	—	—	—
Vacuum Cleaners or Electrically Operated Appliances	205,387	367,260	262,021	3,418	8,288	8,966
TOTAL APPLIANCES AND MACHINERY	8,541,345	10,082,776	9,125,363	425,503	272,942	451,293

The BUYER'S *Column*

A Modern "Multimeter"

SPECIALLY produced at the request of overseas distributors, the "Montrose" Multimeter made its début at the 1950 British Industries Fair.

This pocket-sized moving iron instrument brings the advantages of wide manufacturing experience and accuracy into an inexpensive price range. The Multimeter is simple, robust and reliable, and is equally at home in the workshop or the home.

For its size and weight—3 2/3" by 3 1/12" by 1 7/10" and 7 oz—the Montrose Multimeter has a useful range of scales. Voltage ranges are 0-6-30-150-300 V and as an ammeter it covers a range of 0-30-300 mA—3 amp both on a.c. and d.c. circuits. A 1·5 V battery is fitted internally for circuit testing.

Although the meter was originally produced by TAYLOR ELECTRICAL INSTRUMENTS LTD., 419/24 Montrose Avenue, Slough, Bucks, at the request of their overseas agents, supplies are available for the home market. The provisional list price in the U.K. is 32s. 6d.

High Temperature Panel Heaters

RADIATORS in the true sense of the word, the "Thermovent" high temperature panel heaters, now marketed by E. K. COLE, LTD., Southend-on-Sea, emit radiant heat over a considerable area. This radiation is not effected by rapid air changes or draughts and the heater therefore can be considered ideal for locations which have a high heat loss (large glass areas) and a high rate of air change. The application of this type of heating is also suited to open air and semi-open-air schools, hospitals, solaria, workshops and many temporary buildings.

The "Thermovent" panel illustrated is of all-metal construction, is rectangular in shape (24 in. by 15 in.) and is rated at 1½ kW (another model to order at 1 kW). It embodies a new idea in design—the front radiating surface comprises several cells, each of which carries a robust low-temperature element, these being interconnected by suitable busbars to a common mains outlet. Efficient heat insulation of the back tray ensures a 90% effective output from the front plate.

Adjustable fixing brackets permit either horizontal or vertical mounting or suspension hooks can be provided as an alternative.

Finish of the radiating surface is cream vitreous enamel and the heater casing is in bright cadmium-plated steel. The unit is available for use on mains voltages 220-250 V or for other voltages to special order.

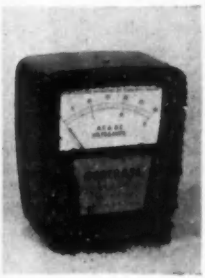
Seen in a new Light

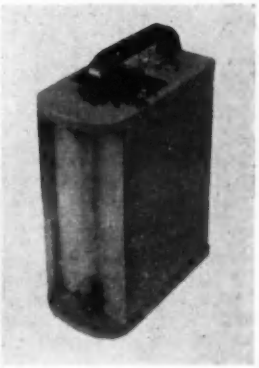
COMPARATIVELY new arrival in the sphere of illuminating engineering, the "Proscon" fluorescent Handilamp has many good points about it. It is strongly constructed in steel with a hard wearing, light green stove enamelled finish and brings the advantages of portable fluorescent lighting to the farmer and countryman.

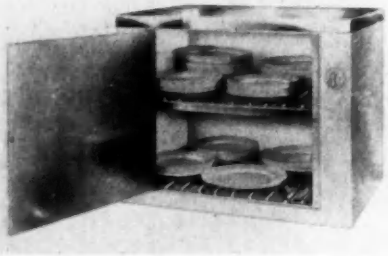
Its use is not limited, however, to the country dwelling, townsfolk will find it very useful wherever a large area of lighting is required.

The Handilamp is fitted with a 9-in, 6 W fluorescent tube operated from two 45 V dry batteries connected in series. The tube itself is protected by a semi-circular transparent plastic shield which affords an angle of 180° of illumination. Weight of the lamp complete with batteries is 8½ lb, and dimensions are 7¾ by 4½ by 12 in. Price from the makers, PROCESS CONTROL GEAR LTD., 56 Victoria Street, St. Albans, Herts, is £5 5s. There is also a mains model available at £4 15s.

Left: The Ecko high temperature panel heater. Centre: The new Montrose Multimeter. Right: Proscon's fluorescent Handilamp







The hot cupboard that Jackson built

Hot Food when it's wanted

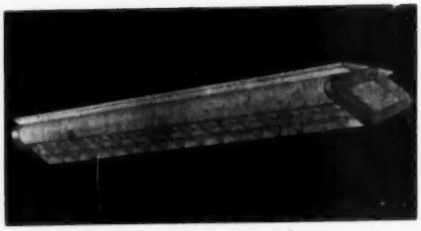
NOTHING spoils one's lunch more than does a lukewarm meal served in place of the expected "hot dish." The wise restaurateur makes certain that he pleases his patrons by installing Jackson catering equipment.

The Cat. No. 520 electric hot-cupboard has been especially designed to help keep plates and plated meals hot. It has room for over one hundred dinner plates at one time, and is thermostatically controlled, having a temperature range of 100° F. to 200° F., quite adequate for its purpose. Standard model is constructed of sheet steel, finished in cream stove enamel and has a dull chromium-plated top. Loading is only 1 kW and exterior measurements are convenient—27 in. wide by 20 in. deep by 21½ in. high. Price of this essential item is £22 15s. and the makers—the JACKSON ELECTRIC STOVE CO., LTD., 143 Sloane Street, London S.W.1.

Scemco introduce the "Louvex"

DESIGNED especially for attachment to the company's standard swallow fitting, the "Louvex" diffusing fitting enters the market at a price which is more than competitive.

Introduced by SCEMCO LTD., Soho St., London, W.1, the "Louvex" fitting has been carefully designed to provide the maximum level of glare-free illumination. Side panels are in "Perspex" and join white stove enamelled metal pressings in which are transparent plastic windows. The "egg box" louvre is also finished in white stoved enamel. List price of the fitting is £8 12s. 6d., plus p. tax.



The "Louvex" fitting by Scemco

Fisher Washer Improved

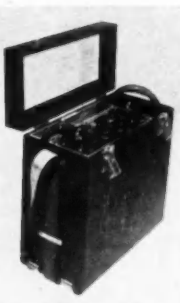
AN interesting exhibit noted at the Birmingham section of the British Industries Fair was the improved Standard washing machine which was shown by H. FISHER (OLDHAM) LTD.

Improvements to this well-known model include the incorporation of a thermal overload motor protection cut-out, the fitting of chromium plated handles on the wringer body and a new device for locating the spring and bearings in the wringer which will guard against misuse.

The extra charge for these improvements is 9s. 6d. so that the list price of this standard Fisher washer is now £45 19s. 6d., plus p. tax for home trade.

Tracing Trouble

ANOTHER instance of "swords into ploughshares" is evidenced in the introduction by ADDISON ELECTRIC CO., LTD., 163 Holland Park Avenue, Kensington, London W.11, of an instrument recently developed by them for the tracing of unknown paths of cables and pipes.



The Addison tracer unit

In use an alternating current is injected at one end of the cable, or pipe under test. This gives rise to an alternating magnetic field surrounding the conductor. When the tracer is placed in this field e.m.f.s are induced in the special coils in the instrument; after amplification these e.m.f.s are audible in headphones. The magnitude of sound from these e.m.f.s decreases or increases in an inverse proportion to the distance between the tracer and the conductor under test.

The tracer is a self-contained portable unit comprising a wooden carrying case, two special detector coils, a combined l.t./h.t. battery, a pair of piezzo-electric headphones and a three-stage amplifier. Dimensions are 12 by 12 by 6 in. Total weight is 11 lb.

TRADE PUBLICATIONS

TELEVISION DOWNLEAD CABLES. Many of the first quality cables supplied by R I. Callender's Cables Ltd., Norfolk Street, London W.C.2, are shown and described in Leaflet 244a.

GEARS AND GEAR UNITS. David Brown Gears (London) Ltd., Stonebridge Park Works, North Circular Road, London, N.W.10, are specialists in the production of gearing for every industrial purpose. The range of the firm's "on the spot" service is described in a new publication issued by the company. Transmission engineers will find the data and tables useful.

Alter the 1947 Act!

—urge E.T.U. Delegates

Lively Suggestions at the Union's Annual Conference

THE Electrical Trades Union wants the 1947 Act altered to make it obligatory for the British Electricity Authority and the Area Boards to set up their own contracting departments—that was the basis of a motion proposed at the Union's annual conference at Ramsgate on Tuesday of last week. Accepting the proposal, Mr. W. C. Stevens, general secretary of the E.T.U., assured the delegates that the Executive would do its utmost to see that the suggestion was implemented at the earliest possible moment. It was realised that development was lagging—that those Area Boards which acquired company undertakings carrying out a considerable amount of contracting work, were expanding, whereas some others did not appear to be doing anything about the matter, he said.

Pay Claim

At the opening of Tuesday's session of the conference, a resolution calling on the Executive of the Union to reopen negotiations with the National Federated Electrical Association for an increase of 6d. per hour in the basic rate for electricians, was carried unanimously. About 45,000 workers would be affected by such an increase, and it would cost the employers about £9,000 per working day, or £2,340,000 a year, it was estimated. It was observed that the introduction of payment by results at this stage was improbable, due to the numerous small contractors who entered the industry, and to the lack of standardisation of materials.

Replying to a question as to the present position in regard to the wages claim for the electrical contracting industry, Mr. Stevens explained that their claim before the National Arbitration Tribunal last year was deferred for six months to allow both sides to examine the possibility of introducing systems of payment by results. During this period, the Union had approached the N.F.E.A. and the E.C.A. of Scotland, making proposals indicating that they were not prepared to discuss the introduction of systems of payment by results, unless they were allowed as an organisation to go in and negotiate the actual system at the time the firms made their tenders.

The reply from both organisations amounted to "nothing doing," he said, so the Union had reported to the Arbitration Tribunal its failure to obtain any satisfaction, and asked that the hearing of the claim be resumed. The Tribunal had now arranged for a hearing to take place on June 29.

The conference later approved a resolution urging the Executive to press for an immediate increase in the rates of pay for juveniles in all sections of the industry, but rejected another suggesting that there should be provision for additional payments for men with long service with one employer, on the ground that it was against trades union principle. The much publicised special motion urging the Executive to continue to press for statutory control of profits, and to continue to oppose wage freezing, was passed.

Statements on an apprenticeship scheme, the 44-hour week, and travelling time agreements in the contracting industry were made by Mr. R. G. McLennan, on behalf of the Executive. In regard to the first named, all the details of the scheme had been agreed, but the employers had stated that the operative date was conditional upon the settlement of the proportion of apprentices to journeymen; the question of casual boy labour, and the question of mates. To this the Union took strong exception, and had raised it as a dispute with the Minister of Labour.

Regarding the 44-hour week over 5 or 5½ days, he said there was no reason why members employed by a contractor working a 5½ day week and wishing to do a 5-day week, could not make application to do their 44 hours in 5 days.

In reference to the agreement for travelling time and fares, this catered for three sections but there was no question of the operative making profit. It was a matter of getting from the employer what had been expended. Experience told them that many members, who had been recruited on the sites, had been "swindled" for months. The resolution of Mr. F. Dewar (Dorking) seeking to achieve for manual workers equality of wages and conditions with those of the clerical grades in the electricity supply industry, was carried unanimously, as was another requesting that steps be taken to educate members serving on works committees on the B.E.A. in order that they were fully aware of the responsibilities and duties to fellow-workers.

Workers' Control

Direct labour, full employment, housing and trade union rights were some of the subjects discussed at Wednesday's session.

The following day other motions of the Special Executive Council, relating to compensation and control by workers, to which we referred last week, were debated at some length. After Mr. Alexei Podushkin, chairman of the Central Committee of the Soviet Union of Power Station Workers had addressed the conference in Russian, the motion urging the Minister of Fuel and Power to eliminate from control at management level all personnel in the nationalised electricity supply industry who had been actively opposed to the principle of nationalisation, and to replace them by supporters of nationalisation, was discussed and approved. The conference also reiterated its insistence that

there should be a greater degree of workers' control of the industry—this control to be exercised, at least in part, by direct representatives from the trade unions having members in the industry. Mr. F. Haxell, assistant general secretary, declared that steps must be taken to provide seats on the nationalised industries for workers.

Unanimous support was given to the other Executive motion which urged the introduction of legislation to ensure that development of the nationalised industries should not be burdened with compensation charges which should be chargeable to the National Debt Fund. It was also suggested that interest on stock should be reduced by 50%.

An Executive resolution calling on the union members in the shipbuilding and engineering industries to vote for strike action in pursuance of their claim for a £1 per week increase in wages, was also adopted.

Safety of Public

The Conference decided that it should be Union policy to urge the public enforcement of I.E.E. regulations and other measures to make domestic apparatus safe. This motion stressed that two-pin outlet should be abolished, and that 3-core flex should be compulsory on all portable apparatus. A member, expressing concern at the "increasing number of accidents and fatal accidents arising through the use of unsafe domestic apparatus," said wiring not up to I.E.E. standard was being done every day. Anyone could buy equipment not suitable for the job, thus creating potential death and fire traps.

Moving a further motion requesting the Executive to press the B.E.A. to carry out a policy of full electrification, Mr. E. W. Tubb declared that the number of homes still lit by gas was a national disgrace. Opposing the motion, on behalf of the Executive, on the grounds that the Authority could not be blamed for lack of development, Mr. T. Vincent said the post war period created difficulties in developing rural electrification, and he suggested the motion should be referred back to the Executive for consideration. When put to the vote, the motion was defeated.

The complete revision of the Factory Acts in order that they should be made applicable to the complexities of modern industry was urged in another resolution which was approved. It was stated that out of a working population of 20 million, 11 million were not covered by any statutory legislation. The conference also asked the Executive to proceed with the formation of a proper apprenticeship scheme in all industries; to endeavour to obtain two weeks' minimum annual holiday with pay for members; and to explore the possibilities of negotiating superannuation schemes for all members.

Friday's session was devoted to a number of resolutions relating to peace questions.

Importance of Plant Engineers Emphasised

CHOOSING the status of the professional engineer as the theme for his presidential address at the third annual conference of the Institution of Plant Engineers last Friday, MR. E. G. PHILLIPS, O.B.E., M.I.E.E., M.I.Mech.E., had much to say of the "silent service" offered by members of the Institution, and of its widespread importance.

The forerunner of the plant engineer, said Mr. Phillips, was the millwright, a craftsman skilled in the use of the few tools available to him and relatively unrestricted by trade union customs from performing a wide variety of tasks. Replacing the millwright was the engineer who, "according to the register of Employment Bureau of the Ministry of Labour . . . can be anything from a man recently demobbed from the R.E.M.E.'s to Sir Frank Whittle of jet engine fame." Apart from the authorised use of the adjective "chartered" by members of the senior engineering Institutions, there was little to prevent effective misrepresentation, and in the minds of the public, "engineer" had a trade rather than a professional implication.

Normally an individualist, the plant engineer rarely worried much about his status, a tendency recognised by the founders of the Institution of Plant Engineers. It was time that the membership of the Institution expanded into tens of thousands, for with such backing it would cause industry to recognise more fully that there was within its midst a body of professional men fully qualified to keep the wheels of industry turning with efficiency and reliability.

Finally, said Mr. Phillips, the plant engineer should take the greatest pride in his work, and lift his eyes occasionally from entirely self-centred problems, and tell the world how it was dependant on him and his colleagues. Flag waving at every opportunity was required, so that the higher authorities could gradually be made aware that his status had been degraded by the very loose term "engineer." The professional engineer should be fully recognised, and given the status worthy of his training, his experience, and his proved ability.

It was necessary for members to get down to such problems at branch meetings, to ascertain what was wrong and to suggest considered remedies, so that the policy of the Council of the Institution might run parallel with the needs and desires of its members.

THE WEEK
INDUSTRY *in news* COMMERCE

Scope for more Power Tools

THE application of portable power tools in the average American plant is more extensive than in the average British factory, says the productivity team on "Materials Handling in Industry" in their report just published. The team point out that although the types of tool seen were conventional and similar to British design, both American management and operatives are "power-driven tool conscious." The report comments that besides almost halving the time taken for the job, the saving in operator fatigue is considerable.

General recommendations of the team are that individual companies here should survey suitable arrangements to reduce the amount of labour required, and introduce better materials handling systems. Liaison should be established with the Handling Division of the American Society of Mechanical Engineers.

The team included: W. J. Dimmock, secretary (assistant works manager, Hoover Ltd.); H. S. Carnegie (deputy chief engineer, English Electric Co. Ltd.); N. A. Jenkinson (mechanical handling specialist, Babcock and Wilcox Ltd.); E. G. Taylor (engineer, G.E.C. Ltd.); N. Macdonald represented the Portable Electric Tool Manufacturers' Association.

Progress in Productivity

THE steel castings industry—a branch of the engineering industry—may be small, but it is none the less virile. Only a year ago steel founders sent their first productivity team to America. Since then a report of their findings has been published, a productivity committee formed to implement the team's recommendations, and two convention held to discuss productivity.

At a London press conference last week, leading members of the industry—among them two Trade Union officials—explained the progress the trade had made towards increasing productivity. Mr. Frank Rowe, chairman, British Steel Founders' Association, said that of some 80 firms in the industry, 62 were members of B.S.F.A. As a result of long personal contact between manufacturers, technical improvements were being exchanged.

Both Mr. R. W. Casasola, of the Amalgamated Union of Foundry Workers, and Mr. J. H. Wigglesworth, general secretary of the Iron, Steel and Metal Dressers' Trade Society, stressed that there was now better co-operation between management and workers. Trade Unionists were not opposed to the introduction of new methods likely to bring about increased productivity.

Agreement in Northern Ireland

THE notice of the intention of the technical staff in the electricity supply industry in Northern Ireland to withhold their services, to which we referred last week, has been withdrawn as the result of meetings held in Belfast last Thursday. Final settlement was reached by representatives of the Northern Ireland Electricity Supply Industry Joint Board and the E.P.E.A. The new salary scheduled was accepted, together with a number of upgradings.

New Alloys for the Industry

EFFECT of currency devaluation upon the world economic situation in general, and upon inter-European trade in particular, occupied an important session at the recent two-day International Convention of the Driver-Harris Companies. Representatives of Continental countries confirmed that as a result of devaluation the pre-war position had been restored and a considerable volume of additional business had been obtained.

Mr. W. F. Marsh, director in charge of production, said the firm had been greatly hampered by the difficulty in obtaining much-needed new plant. Even so, within a period of three years production had been increased by 50 per cent.

Director in charge of technical development and testing, Mr. W. M. Kay, described the progress being made with new alloys, notable among them being the high-temperature thermocouple alloys T-1 (nickel-chromium) and T-2 (nickel-aluminium), and the alloys for glass-metal sealing which have an important outlet in radio and television, and other sections of the electrical industry, and in ceramics production.

The First Half-Century

This week Londoners had the opportunity of seeing for themselves what difference is made by the substitution of electricity for steam as a means of traction on an ordinary railway. The experience is not difficult to acquire as it involves nothing more than travelling between Earls Court and High Street, Kensington, or vice versa. As far as the passenger is concerned, the verdict will be that there is very little difference except that the train is neater, cleaner and better appointed. The smoothness of the running gives the idea that the train is going rather more slowly than is usual, though the reverse is, of course, the case.—*From our issue of May* 24, 1900.

Export Progress

PRIVATE trade exhibitions staged by Dexion Ltd., in seventeen British cities and towns have been so successful that the firm is now exhibiting overseas. First country selected is Switzerland, with Canada and Belgium booked for later efforts.

During this month three exhibitions, each of four days' duration, are being held in Lausanne, Basle and Zurich. The exhibitions were preceded by intensive advertising in Swiss newspapers and journals, and potential Dexion users were circularised. First reports from Lausanne indicate success of the venture; 5,000 feet of Dexion slotted angle was sold in the four days.

Shell of a new 500-ton capacity power press leaves the works of Wilkins and Mitchell Ltd., for the Luton factory of Electrolux Ltd. Weighing 40 tons and costing £14,000, the press will eventually do three tooling operations at once on the side of a refrigerator

Women Engineers

FOUR young women—all skilled engineers—last week went along to the Women's Engineering Society headquarters in Grosvenor Place, S.W.1, to talk about their jobs. A member of the B.B.C. control-room staff, Miss Barke, explained some of the more difficult aspects of programme planning, illustrating her remarks with helpful diagrams.

From the W.R.N.S., Third Officer Yarrow came along to talk about her job in the Admiralty electrical engineering department. There were, she commented, plenty of vacancies for women engineers in the Navy. But Captain Gavin of the W.R.A.C. told a different story. Although a number of women were already employed in army engineering, there were no further vacancies.

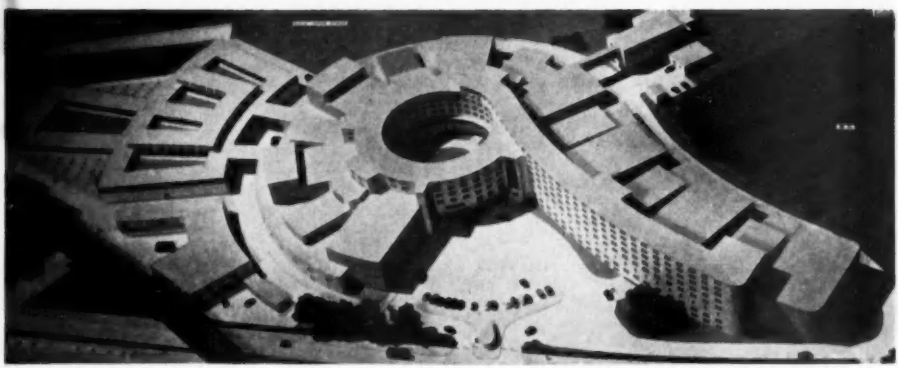
Miss Winslade, member of a radio manufacturing firm, rounded off an interesting evening by explaining the various components of a television set, and methods of assembly.

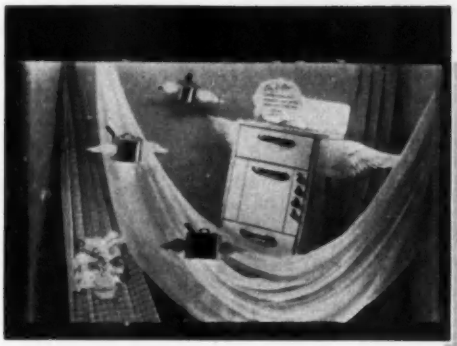
No Theft from Slot Meters

IN THE Eastbourne magistrates court last week, a decision of interest to the supply industry was given. Mrs. J. E. Parker, a householder, was accused of stealing the contents of her gas meter. For the prosecution, Mr. J. R. Ellis claimed that the defendant was guilty of larceny as the money, once put into the meter, belonged to the South Eastern Gas and Electricity Boards respectively. Gas and electricity were supplied on the understanding that the money put in the meters belonged to the Boards. According to the meter readings there should have been £5 1s. 2d. in the gas meter and £1 9s. in the other. It was alleged that Mrs. Parker admitted taking £2 10s. from the gas meter in February and subsequently had taken out further sums.

The magistrates' clerk pointed out that it could

Designed by Graham Dawbarn, C.B.E., M.A., F.R.I.B.A., in association with M. T. Tudsbery, C.B.E., M.I.C.E. (civil engineer to the B.B.C.), the proposed development of the Corporation's 13-acre White City site at Shepherd's Bush is shown in our photograph. The portion of the scheme containing the circular buildings and those to the left will be erected first





In lighter vein : Seeboard staff stress the ease of electric cooking in this window display at the Bureau

Showing what cleverly planned lighting can do for the corner of a demonstration centre. Designed by Seeboard staff at the Lighting Service Bureau

be said that money while in the meters, still belonged to the husband and he might be summoned in the County Court for the amount missing. The meters might be considered a mere convenience for the collection of the money. The magistrates dismissed the charge, considering the accused had no case to answer.

Training Showroom Staff

FOR AREA Boards all over the country, training of district showroom staff presents unusual difficulties because of the wide areas involved. Many districts have organised monthly meetings, however, and this month Purley district of Seeboard hit upon the ingenious idea of holding their May meeting at the London Lighting Service Bureau. The result was a particularly attractive demonstration of interior display and window lighting at the Bureau in Savoy Hill, W.C.2.

The shop lighting section was dressed throughout by Seeboard's display department, and R. L. C. Tate, the Bureau shop lighting specialist, gave a lively lecture profusely illustrated with demonstrations and slides. The Board's own displays provided further practical demonstrations in what was generally claimed to be a most useful meeting. The evening's programme, shared by members of Croydon district showroom staff, concluded with a tour of outstanding shop lighting installations in the West End.

Staythorpe Power Station

IN OUR article on Staythorpe power station in last week's issue, we referred, under the heading of "Main Contractors," to the circulating water pumps as being made by Harland Eng. Co. and J. and G. Weir, Laurence Scott and Electromotors. These firms were in fact responsible for the feed water pumps, the c.w. pumps being made by Drysdale and Co. Ltd. In all, five of these pumps have been supplied with a combined capacity of 250,000 gallons per minute.

Practical Example pushes Sales

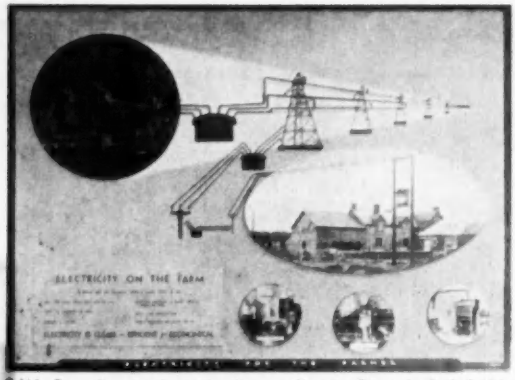
DISREGARDING the heavy restriction that purchase tax imposes upon sales of electric water heaters, at least one London electrical retailer and contractor is making a special drive for business. What is more, the window display of Mortimer, Gall and Co. Ltd., in Cannon Street, E.C.4, embodies a novel technique to attract customers.

Sales are primarily directed at the City business man looking for an economical way of providing hot water for his staff cloakroom, so the firm is displaying a practical example in its own showroom window.

A dial records the running cost of an electric heater in the staff cloakroom (used by ten people). The daily cost is recorded on a small card to illustrate the economy of electric water heating. So far the daily average is 4d.

British National Electrics Ltd. enthusiastically co-operated in the display, and for the enquiring customer a "Charlton" water heater in cross section shows interior detail.

Mortimer Gall's current window display



S.W. Board's stand at the Devon County Show included this diagram of electrical distribution

Economising in Wiring?

THE suggestion that it should be possible to design a normal electrical installation within a cost of £30 for a three-bedroomed house, is made in a list of numerous possible economies by the Committee reporting on the Cost of House-building, this week. No indication is given, however, as to what form the installation should take. Earlier it is noted that fewer electric points and other economies in electrical installations have contributed to the saving of £41 per house achieved between 1947 and 1949. Nevertheless, the Committee considers it improbable that under present conditions there can be any substantial reduction in the general level of house-building costs in the near future—indeed, it may be difficult to avoid an increase.

Wage Increase would mean Disparity

DISPARITY between the relative increases of industrial electrification and production needed urgent investigation, declared Mr. L. R. Perkins, chairman of the Association of Supervising Electrical Engineers on Saturday. He was speaking at the Association's annual conference at the Cora Hotel, London.

Although total consumption of electricity was more than twice as much as in 1939, said Mr. Perkins, the Board of Trade's figures only showed an increase in total production of 6% since then. Because of reluctance of the operative worker to permit mechanisation to play its full part, the possible benefits were not being passed back to the community. Improvements would not take place unless workers exercised more self-control, showed themselves amenable to discipline and took a long-term view of national economics.

Referring to the cost of living, Mr. Perkins commented that disparity in the relative welfare of the two sections of workers in the industry would be increased if operatives in the contracting section of the industry obtained an additional 6d. per hour as suggested at the E.T.U. conference.

More Television Sets on H.P.

ALTHOUGH sales of radio sets dropped again slightly during March, the monthly average number sold per shop is still much higher than that of a year ago, says the latest R.T.R.A. sales index. Figures are: radios, 10·50 compared to 6·26 last year; television 7·32 compared to 2·94 in 1949.

On the radio side there is a pronounced increase in the sale of radiograms. In the case of television a higher percentage of sets were sold on hire purchase. For March, 1949, 23·57% of T.V. sets were on H.P., whereas for 1950 the percentage has increased to 32%.

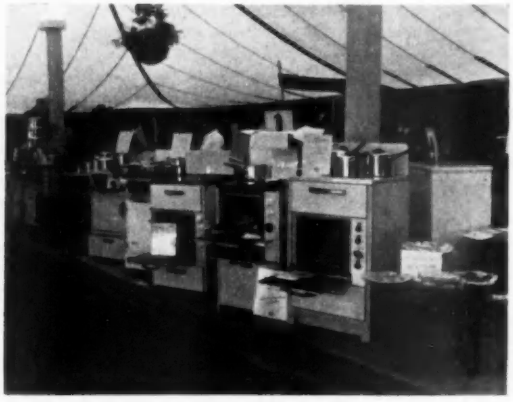
Electricity Explained

SCHOOLCHILDREN always learn more eagerly when knowledge is imparted in a light-hearted way. Realising this, E.D.A. have introduced working models with an instructive purpose into their current display at the Schoolgirls' Exhibition in Westminster.

A vacuum cleaner, for example, in transparent plastic, shows the girls exactly what happens when the cleaner is running. Another exhibit demonstrates variable control of an electric cooker hot plate, varying degrees of illumination being produced by turning the usual control knob. Colourful illustrated charts explain how other electrical appliances work.

Instruction in the care and handling of electrical equipment is to be given in Lancashire schools. The education committee there has approved N.W. Board's offer of co-operation. The Board has also offered to organise electrical housecraft weeks in some schools.

Appliances featured at Eastern Board's stand at the Hertfordshire Agricultural Show



NEWS IN BRIEF

An Order freeing electric dry batteries from price control came into effect yesterday. Full title is: The Electric Torch Dry Batteries (Maximum Prices) (Revocation) Order, from H.M. Stationery Office, S.I. 1950, No. 808, price 1d.

More than 7,300 visitors toured the Falcon works of Brush Electrical Engineering Co., Ltd., when, for the first time in 71 years, an "open day" was held.

Agents of Tube Investments companies from 11 European countries and Egypt began a three-day sales conference in Birmingham yesterday.

An addendum to their 1949 Year Book has been published by the British Standards Institution, 24/28 Victoria Street, S.W.1, price 2s. post free.

The "Bakelite," "Wareite" and "Vybak" plastics exhibition is to be held in Manchester from June 7-13 (except Saturday and Sunday). On show at the Assembly Room of the Bleachers Association Ltd., Blackfriars House, Parsonage, Manchester 3, admission can be obtained on presentation of a business card.

The Steel Distribution Control scheme, operated by the Ministry of Supply since March 1940, was discontinued as from May 22. In future all steel products, except sheet andtin plate, would be purchased without licence.

Some of the many ways in which electricity can be used in the garden are being featured on E.D.A's stand (No. 46) at the Chelsea Flower Show. Central exhibit consists of an electrically-warmed propagating bench for use in the greenhouses of amateur gardeners.

Summer meeting of the Southern centre, I.E.E., on June 9, will include a visit to the new generating station at Poole and a tour of Corfe Castle.

Questions in Parliament

Tax on Vehicles

During the debate on the second reading of the Finance Bill, in which several Members referred to the new tax on vehicles, and some concession for the electric vehicle was sought. Mr. Dodds remarked that the anomaly was not so much on the petrol vehicle as on the electrically-driven one on which the tax was 33⅓%. At present there were about 15,000 electrically-driven vehicles, and it was estimated that these saved 14,500,000 gallons of petrol, or $2½ million a year. The batteries were charged at off-peak periods, consuming some 200 million units. Other factors in their favour were the absence of noise and fumes, and they were safe to the public because their maximum speed was 16-18 m.p.h. In addition, an electrically-driven vehicle cost £200 to £400 more than a petrol-driven vehicle of the same size, also, it was fantastic to apply a 33⅓% tax to the battery and, in addition, to the charger, which was an essential component. It might be that the Chancellor thought there would be a switch-over from petrol to electric vehicles if he relieved the latter of tax, but Mr. Dodds considered that an illusion, for the electric vehicle was applicable only to certain types of delivery work. He put forward four points to support the giving of some concession to the electric vehicle: (1) used only for short hauls, therefore the railways would not be deprived of business; (2) cleanliness and economy of labour in door-to-door delivery work; (3) they saved dollars; and (4) if the object of the tax was to encourage more to be diverted to overseas markets, that did not apply, for they were of no use in other countries where the distribution problems were entirely different; every attempt that had been made to sell them abroad had failed. He understood that the cost of remitting the tax on electric vehicles was not more than £500,000.

Later, Lieut. Commdr. Baldock also criticised the tax on electrically-driven vehicles as being unreasonable.

Suppressors for Cars

When the Postmaster-General was asked what directions he had issued to ensure that cars were fitted with suppressors, Mr. Ness Edwards replied, none. Under the Act he must consult an Advisory Committee; consultations were taking place with the I.E.E. regarding the nominations of a panel of members.

Distribution Restriction

The Minister of Fuel and Power was asked if he would arrange for the relaxation of the restrictions imposed upon the supply of electricity to houses which had an alternative source of lighting where the existing facilities are unsatisfactory. Mr. Noel Baker answered that in any case where a householder would suffer hardship if electricity were not installed, the area Board may, in their discretion, provide it. But with the demand still exceeding plant capacity, it was impossible to supply all householders who wanted it. For the present, priority must be given to industry, farms, and new houses with no other means of lighting.

Gas Turbines

Replying to a question by Mr. Blackburn, the Minister of Fuel and Power said he regarded the development of the gas turbine to use coal and cheap fuels derived from coal as one of the most important matters in which his Department was engaged. The Department, with the full support of the Scientific Advisory Council, was directing a wide programme of research on the subject. The programme includes research on other industrial gas turbines to use peat and the firedamp contained in the upcast from collieries. Research into the use of peat was being done in co-operation with the Scottish Home Department.

Electric Supply News

Durham

The Rural Council has had an interview with officials of the Wear sub-area of the North-Eastern Electricity Board regarding the supply of electricity to Witton Gilbert and Kimblesworth, at present supplied by the National Coal Board. Mr. E. C. Lennox, for the Board, referred to their plans to take over electricity supplies at present controlled by the N.C.B. He pointed out, however, that there would be an inevitable delay of up to five years in the execution of these works due to the fact that no agreement had been reached between the original colliery owners and the N.C.B. regarding the valuation of these undertakings. When agreement was reached further negotiations would have to take place between the Electricity Board and the N.C.B. Mr. Lennox gave an assurance that there would be no difficulty in affording a supply of electricity from the Board's network for any housing or industrial developments in the Witton Gilbert area.

Gateshead

The Town Council which recently decided that houses on the Wrekenton housing site should be equipped with both gas and electricity mains has been informed that the North-Eastern Electricity Board was not prepared to install cables and equip substations without knowing the number of houses to be all-electric. The Council decided that electricity should be installed only for lighting and immersion heaters and one plug. Cooking and washing will be done by gas. A previous motion that tenants of council houses on the estate should have a choice of either gas or electricity for cooking and washing has been rescinded.

Ince

We understand that the B.E.A. has now agreed that the design of the Ince new generating station should proceed on the basis of a semi-outdoor layout.

Kirkcaldy

At the recent meeting of the Town Council Housing Committee, there was some debate on the question of whether future council houses should be all-electric. Dean of Guild A. R. Dall, said it would be to the advantage of the council and town as a whole, to continue the policy of all-electric houses. To lay cables and merely use them only for lighting was not an economical proposition. By taking a bigger load for supplying cookers and boilers it became a proposition the electricity board would look at.

The more custom they gave the board the more likelihood of the board meeting their suggestions regarding services. He personally had heard very little complaint about electric cookers. Another member suggested permanent houses should have dual supplies, but the heavy cost of this was stressed. It was agreed to continue installing electric cookers and wash-boilers.

Midlands Board

At the recent meeting of the Area Consultative Council it was suggested that until connection terms were fixed on a national basis, charges should be based on the size of farms and other premises to be connected, instead of on the cost of the individual supply. The proposal was made on behalf of the local branch of the National Farmers' Union, but it was reported that the appropriate N.F.U. committee had decided that the time was not opportune to carry out the suggestions.

N. Ireland

When the Erne Drainage and Development Bill was given a second reading in the Ulster House of Commons last week, members asked whether Northern Ireland consumers would obtain supplies from the Belleek hydro-electric station when it was completed. The Minister of Finance, Major Sinclair, said that would be a matter for further negotiation, but there seemed no reason why such arrangements should not be made. He reminded the House that the gradient of the River Erne within Northern Ireland was not suitable for hydro-electric development. It was only below Belleek, where the Erne left Northern Ireland, that the gradient became steep, and it was in that portion of the river down to Ballyshannon that the hydro-electric scheme was being developed.

Shetlands

It is expected that the first islands in Shetland to get a supply from Lerwick, will be connected up this summer. Trondra and Burra, are the two first islands to be supplied. Submarine cables have been laid from the west side of the mainland to Trondra, a distance of about 500 ft, then from the south end of Trondra to Burra, a further 1,000 ft.

LIGHTING SCHEMES

Darlington.—T.C. has received sanction to borrow £6,287 for improved lighting in Coniscliffe Road.

Gateshead.—A scheme for electric street lighting on the Wrekenton neighbourhood unit, costing £2,660, has been submitted to the M.o.H. For centralised control of street lighting, the borough engineer has recommended the installation of Standard Telephones and Cables' d.c. bias system.

Leamington.—The M.o.T. has approved the scheme for lighting Upper Parade and Bath Street by fluorescent lamps.

Rhondda.—The U.D.C. Roads Committee has inspected various street lighting installations in order to discuss proposals for future schemes.

Spalding.—Electric street lighting is to be substituted for gas; it being proposed to use fluorescents in the centre of the town.

Stretford.—Application is being made to the M.o.H. for authorisation to proceed with the improved lighting scheme for Westinghouse Road.

Company Activities

Chloride Electrical Storage Co.

The full report shows a consolidated profit of £2,194,447 (*£1,807,644*) for 1949 plus investment income £26,149 (*£103,789*). Profit relating to prior years—provisions made, no longer required £5,412 (*£38,052*), income less expenditure £29,580 (*£92,431*), making total of £2,255,588 (*£2,041,916*). Depreciation takes £226,085 (*£217,193*), to specific reserve against possible fall in value of stock in trade £165,000 (*£477,500*), directors' emoluments £37,020 (*£42,720*), audit fee £6,546 (*£6,467*), U.K. income tax £899,329 (*£693,284*), other tax £264,860 (*£263,849*), foreign and Dominion tax £22,296 (*£23,564*), less adjustments for previous years £156,780, leaving a balance of £791,232 (*£317,339*). For subsidiaries attributable to outside shareholders £13,943 (*£8,197*) to reserves £9,825 (*£6,604*) and £83,485 (*£37,383*). carried forward. Parent company's balance of profit is £683,979 (*£265,155*) plus £240,978 (*£222,626*) brought in, making £924,957 (*£487,781*). To general reserve £488,703 (*£100,000*), extension of application of scheme of pensions for employees of subsidiaries £50,000 (*£25,000*). After dividends there is £264,451 (*£240,978*) carried forward.

Enfield Cables Ltd.

Group profit for 1949 was £456,504 (*£306,375*). After U.K. taxation £259,500 (*£153,000*), and other taxation £8,204 (*£14,147*), group profit is £188,800 (*£139,228*) attributable to holding company. Final Ordinary dividend is again 3⅜%, making 7% (*same*).

Ever Ready Co. (Gt. Britain)

Trading profit for the year to February 28 last was £634,019 (*£632,406*), plus income from investments in subsidiaries £6,580 (*£6,560*), from trade investments £46,629 (*£36,847*). Profit on realisation of various subsidiaries, etc., nil (*£31,431*). To directors' remuneration £74,889 (*£87,845*), written off plant, machinery, establishments and delivery vans £80,000 (*same*), audit fee £1,530 (*£1,480*), leaving net profit before taxation £530,809 (*£537,919*). Profits tax takes £104,500, income tax £115,500, to reserve account £90,000 (*£100,000*), staff fund £14,000 (*same*), Preference dividends absorb £20,000 (*same*), Ordinary interim 15% £151,560 (*same*) and final 20% (*25%*) £202,081. Carried forward by Ever Ready (Gt. Britain) £119,720 (*£118,414*), retained in subsidiaries nil.

W. T. Henley's Telegraph Works Co.

Consolidated trading balance for 1949 after charging directors' emoluments was £1,792,482 (*£1,595,474*). With investment income £73,482 (*£81,756*), profit on realisation of investments and other assets £17,087 (*£194,989*), and amounts relating to earlier years less taxation £51,697 (*nil*) the total was £1,934,748 (*£1,872,219*). Depreciation takes £190,727 (*£190,861*), payment relating to earlier years, less taxation nil (*£18,978*), profits tax less adjustments £800,676 (*£767,913*), relief from U.K. taxation in respect of initial allowances, carried to reserve £79,762 (*£39,018*), provision for maintenance or sundry contracts £105,000 (*£13,740*) leaving profit of £758,583 (*£841,709*). With £866,313 (*£740,304*) brought in there is £1,624,896 (*£1,582,013*) available. To general reserve £255,000 (*£125,000*), replacement of buildings, machinery and plant reserve £200,000 (*£100,000*), fluctuations in prices of materials reserve £25,000 (*£157,000*), staff pension fund nil (*£150,000*), preference dividend £4,950 (*same*), ordinary interim 5% £44,688, final 10% and cash bonus 5% (*all same*) £134,062, leaving £961,196 carried forward.

Lightfoot Refrigeration Ltd.

Trading profit for 1949, including £8,859 in respect of previous years, is £82,655 (*£84,143*). Dividends from subsidiaries, less tax, amount to £3,705. Depreciation of fixed assets £14,026 (*£15,325*), profits tax £11,500 (*same*), income tax £28,007 (*31,387*), adjustment of tax in respect of previous years £3,398. To general reserve £25,000 (*nil*) Ordinary dividend 5% making 8% (*same*), leaving £31,035 (*£35,316*) carried forward. Consolidated trading profit is £116,621 (*£134,066*), including £8,859 in respect of previous years.

London Electric Wire Co., & Smiths

Group profit for 1949 was £672,978 (*£846,523*). After all charges, including taxation, there is a balance of £400,136 (*£672,975*). Final ordinary dividend is again 6%, making 10%.

Newman Industries

Consolidated trading balance for 1949 was £140,069 (*£204,668*), plus other income £14,263 (*£315*), making £154,332 (*£204,983*). To directors' emoluments £13,404 (*£16,086*), depreciation of fixed assets £60,222 (*£56,540*), pension fund £839 (*£830*), interest £24,801 (*£18,061*), off trade investments £990 (*nil*), taxation £31,300 (*£63,833*), leaving £22,776 (*£49,633*). With £99,489 (*£69,711*) brought in and provision for tax not required £33,717 (*£27,923*), there is £155,982 (*£147,267*). To capital redemption reserve nil (*£12,735*), dividends on 6%. Redeemable convertible cumulative preference stock nil (*£105*), 6% cumulative participating preference ordinary £1,980 (*same*). Ordinary 10% £18,833, leaving £135,169 carried forward.

Dividends Declared

Holophane Ltd. Interim dividend of 7½% (*same*).

Marco Refrigerators. Interim dividend of 7½% (12½%).

Ship Carbon Co. of Gt. Britain. Dividend of 15% (*same*). Net profit £96,859 (*£106,618*).

Worthington-Simpson. Final dividend of 10% making 20% (*same*). Net profit, after all charges, including tax, £152,644 (*£127,949*).

Commercial Information

CONTRACTS OPEN

HOME

May 27.—Driffield U.D.C. Installation of electricity in 52 houses on Eastfield Road housing estate. Surveyor, Council Offices, Eastgate South, Driffield.

May 27. — Hemel Hempstead T.C. Year's supply of electric lamps and repairs to Venner time switches. A. H. Turner, Borough Engineer, Market Square, Hemel Hempstead.

May 27.—Horwich U.D.C. Supply and erection of 17 electric street lamps (concrete columns 25 ft to light source). Engineer and Surveyor, Council Offices, Horwich.

May 29.—Penzance T.C. Installation of electric motors, gearing, etc., for operation of Penzance floating dock gates, D. J. Beattie, Town Clerk, Municipal Buildings, Penzance.

May 29.—Sutton Coldfield T.C. Supply of pre-cast concrete lighting columns and brackets to Falcon Lodge estate. Borough Surveyor, Council House.

May 30.—Glossop T. C. Rewiring electrical installations in 16 houses at Sheffield Road, 16 at Simmondley Lane and 16 at Newsham Lane. Geo. Faulds, Borough Surveyor, Municipal Buildings, Glossop.

May 30.—Swadlincote U.D.C. Supply and erection of 49 Class A 250 W mercury discharge lamps with standards, 16 Class A 240 W fluorescent-type lamps with standards, and 68 Class B 100 W tungsten-type lamps with standards. Engineer and Surveyor, Bark House, Swadlincote. Deposit £1 1s.

May 31. — Ashton-under-Lyne T.C. Wiring installation to 96 houses on housing site No. 4, Crowhill estate. A. T. Kemp, Borough Engineer and Surveyor, Municipal Offices, Ashton-under-Lyne. Deposit 10s.

May 31.—Halifax E.C. Electrical work at schools swimming centre, Park Road baths. Borough Engineer, Crossley Street, Halifax. Deposit £3 3s. (See our May 18 issue.)

May 31.—Hornchurch U.D.C. Provision of 80 street lighting units, consisting of 25 ft pre-cast concrete columns, lanterns, and 400 250-watt mercury vapour discharge lamps, in connection with the scheme for lighting part of the Southend Arterial Road (A.127). Engineer and Surveyor, Billet Lane, Hornchurch.

May 31.—Slough T.C. Provision and erection of pre-cast concrete lighting columns and 400 watt and 250 watt mercury vapour lighting equipment of Group A standard for 11 miles of trunk road. Borough Engineer, Town Hall, Slough. Deposit £2 2s.

May 31.—Twickenham T.C. Supply and erection of one four-body refrigerator at Hampton Mortuary, Borough Engineer, York House, Twickenham.

June 1.—Harwich T.C. Electrical installation in four blocks of eight flats on "The Grange" housing site, Dovercourt. Borough Architect, King's Quay Street, Harwich. Deposit £2 2s.

June 1.—Leeds T.C. (a) Electrical installation to road lighting to Market Hall, Leeds City Markets; (b) electrical installation to road lighting to Wholesale Market. Forms of tender, etc., from Director of Works, Sweet Street, Leeds, 11. Tenders by noon, June 1.

June 2.—Belfast. New electrical installation in auxiliary maternity unit at Belfast City Hospital for South Belfast Hospital Management Committee. F. W. Parkinson and Partners, 93 Ann Street, Belfast. Deposit £2 2s.

June 5.—Acton T.C. Supply and installation of bracket type electric street lighting units in Sunbeam and Atlas Roads. Borough Engineer, Town Hall, Acton, W.3.

Jun. 5.—Hazel Grove and Bramhall U.D.C. Supply and installation of steel columns, lanterns and accessories for provision of improved lighting to Group A standard on one mile of trunk road A.6 (London Road). Engineer and Surveyor, The Council House, Hazel Grove, Cheshire. Deposit £2 2s. (Advertised in this issue.)

June 6.—Manchester E.C. Electrical engineering equipment for Municipal College of Technology. Chairman, College of Technology sub-committee, Education Offices, Deansgate, Manchester 3. (See our May 11 issue.)

June 7.—Belfast T.C. Cafe kitchen electrical equipment. Parks and Cemeteries Department, Botanic Gardens Park, Belfast.

June 7.—Warrington. Rewiring electrical installation at Borough Treasurer's Office, Bank House, Sankey Street. Borough Surveyor, Town Hall.

June 7.—Winsford U.D.C. Installation of electric wiring in 150 pre-war houses. P. Heaton, Surveyor and Engineer, Council Offices, Over Hall, Winsford.

June 8.—Camberwell T.C. Installation of cremation furnaces at Honor Oak crematorium. Borough Engineer and Surveyor, John Clapp, Town Hall, Camberwell, S.E.5. (See our May 11 issue.)

June 9.—Sheffield T.C. Electrical installation in 100 aged persons' flats on Manor Park estate; 16 aged persons' flats on Richmond estate; 44 terrace houses on Manor Park estate; and 41 terrace houses on Littledale estate. Town Clerk, Town Hall, Sheffield 1. Deposit £1.

June 12.—New Windsor. Electrical installation to 30 houses to be erected on Imperial Road site. Borough Engineer, Kipling Memorial Building, Windsor. Deposit £1 1s. (See our May 11 issue.)

June 14.—Wiltshire C.C. Electrical engineering tools for Chippenham section of N.W. Wilts college of further education. P. A. Selborne Stringer, Clerk, County Hall, Trowbridge.

Jun. 19.—Glossop T.C. Electric lighting, special stage lighting, and ventilation for Victoria Hall. Geo. Faulds, Borough Surveyor, Municipal Buildings, Glossop. (Advertised in this issue.)

June 21.—N. Scotland H.E. Board. 132 kV double circuit steel tower overhead line (approx. 65 miles route length) between Boat of Garten (Inverness-

shire) and Aberdeen. Merz and McLellan, 39 Northumberland Street, Edinburgh 3. Deposit £2 2s. (See our May 11 issue.)

Jun. 30.—N. Scotland H.E. Board. 32 miles of 33 kV and 58 miles of 11 kV single circuit wood pole overhead lines and 77 miles of low voltage lines between Huntly and Ballater in Aberdeen county. Merz and McLellan, 39 Northumberland Street, Edinburgh 3. Deposit £1 1s. (Advertised in this issue.)

July 17.—Waterford C.C. Electrical services comprising lighting, cooking, laundry, sterilising and associated hospital equipment at Ardkeen Sanatorium. (Fourteen major buildings, covering 20 acres.) Engineer, N. Mathews, 104 Grafton St., Dublin. Deposit £15 15s.

July 24.—Bootle. Manufacture and erection of pumping plant in Hapsford Road Pumping Station, including two sets of electrically driven unchokeable pumps, each capable of 1,000 gallons per minute, for Rimrose Brook Joint Sewerage Board. Engineer to the Board, G. M. C. Taylor, Artillery House, Artillery Row, Westminster, S.W.1. Deposit £5.

No date stated.—Cumberland C.C. Electrical installation at judge's lodgings at "St. Anns," Stanwix, Carlisle. County Architect, 15 Portland Square, Carlisle.

No date stated.—Eston U.D.C. Supply and erection of electric street lighting units with brackets, lamps, time switches, and internal wiring in various parts of the urban area. N. C. Harrison, Surveyor, Normanby Road, South Bank, Yorkshire.

No date stated.—Newbiggin U.D.C. Electrician's work for 26 houses on Spital Farm estate. Surveyor, Council Offices, Newbiggin.

No date stated.—Haltwhistle R.D.C. Electrical wiring of 44 houses on Redburn housing estate. Surveyor, Council Offices, Haltwhistle.

No date stated.—Lancs C.C. Electrical installation at (*a*) Marbenthe, Waterloo, hostel for aged persons, (b) Singleton Hall, near Blackpool, residential special school for physically handicapped boys. County Architect, County Offices, Preston. Deposit £2 for each job. (Applications by May 27.)

OVERSEAS

Details of items marked • may be obtained on application to Room 1076, Board of Trade, Thames House, North Millbank, S.W.1, quoting reference.

May 31.—Greece. Various tenders for machine tools, gauges, instruments including rectifiers, coils and armature testing outfits, voltage and amperes testing outfits, etc. Reconstruction Procurement Committee, Ministry of Agriculture, 10 Philellinon Street, Athens. B.o.T. (Ref. CRE (IB) 52457/50).•

May 31.—Iraq. Electro medical apparatus. Central Foreign Purchase Committee, Baghdad. B.o.T. (Ref. CRE (IB) 52999/50).•

June 6.—Wellington. 110 kV outdoor switchgear and structure for Mangahao power station. Contract 148. State H.E. Dept., Wellington. Deposit £100; bond £300.

June 12.—New Zealand. 100 milliameter 5-0-50 MA d.c. flush mounting 2½ in. diameter moving coil centre-zero. Director-General (Stores Division), G.P.O., Wellington, C.I. B.o.T. (Ref. CRE (IB) 53094/50).•

June 13.—Cairo. Two diesel generating sets for extension of power station at Tura prison and dismantling of present diesel units. Mechanical and Electrical Department, Egyptian Ministry of Public Works, Cairo. B.o.T. (Ref. CRE (53100/50).•

June 13.—Wellington. Thirteen single phase, double wound transformer units, each 9,259 kVA, 11/127 kV, 50 c/s, outdoor type, oil immersed and water cooled to form four 27,777 kVA transformer banks and spare unit for Whakamaru power station. Contract 149. State H.E. Dept., Wellington. Deposit £100; bond £4,500.

June 15.—Madras. H.T. pin, strain and post type insulators conforming to departmental specification No. P.6. Superintending Engineer (Technical), 157 Mount Road, Madras 2. B.o.T. (Ref. CRE (IB) 53193/50).•

June 16.—Montevideo. Supply of masts for support of o.h. lines of 110 kV. Usinas Electricas of Telefonos del Estado. B.o.T. (Ref. CRE (IB) 52276/50).•

June 16.—Wellington. 30,000 lamps, switchboard, B.P.O. No.

Your Queries — Answered

"Jubilee" cream making machines, makers of? T.E.—British Emulsifiers, Ltd., 12 Greek St., W.1. (18129)

"Jones" plugs and sockets, makers of? D.—Standard Telephones and Cables, Ltd., Connaught House, Aldwych, London W.C.2; Painton and Co., Ltd., Bembridge Drive, Kingsthorpe, Northampton. (18134)

"Keramot" insulating material, makers of? T.E.—Siemens Bros. and Co., Ltd., Woolwich, S.E.18. (18142)

"Concentra" terminal strips, makers of? T.E.—Alfred Cohnreich, Ltd., 157 High Road, N.15. (18145)

"Empire" electric clocks, makers of? S.W.—These were made, up to 1938, by English Clock and Watch Manufacturers, Ltd., when the firm went out of business. The parent company, Smiths English Clocks, Ltd., Service Dept., Cricklewood Broadway, N.W.2, may be able to help regarding spares. (18149)

"Lo-Vo-Lite" transformer, makers of? D.B.—Igranic Electric Co., Ltd., Bedford. (18153)

"Rawl" or "Roll" convector heater, makers of? R.O.—We presume this inquirer refers to the products of Rowe Bros., Ltd., of Pall Mall, Liverpool. (18157)

Cellophane sealing machine (small, hand - operated), makers of? T.E.—Funditor, Ltd., 3 Woodbridge St., E.C.1.; Rose Bros. (Gainsborough), Ltd., 5 Theobalds Rd., W.C.1. (18162)

The above are selected from questions we have answered this week. If you have a query, send it to us.

ANSWER WANTED

"C. and R." flashers, makers of?—B.B. (18159)

2, 24 V. Quotation No. P. and T. 150/3396. Director-General, Stores Division, G.P.O., Wellington, C.1.

June 19.—Tangier. Oil-cooled, 3-phase, 50 c/s transformer from 50-400 kVA. Monsieur l'Ingenieur en Chef des Travaux Publics d'Etat, Administration Internationale de la Zone de Tangier.

June 19.—Tangier. Transformers from 50-400 kVA to reinforce electric light circuit in zone. International Administration, Tangier. B.o.T. (Ref. CRE (IB) 52784/50).*

June 21.—Brisbane. One low tension air-break steel cubicle type switchboard, comprising two alternator panels, four feeder panels, station panel, clock panel, etc. B.o.T. (Ref. CRE IB) 52694/50).*

June 27.—Wellington. Four 3-phase 50 kV 500 MVA circuit-breakers and accessories for Tauranga substation. Deposit £100; bond £275. Secretary, Tenders Committee, State H.E. Dept., Wellington, New Zealand.

July 10.—Johannesburg. Steam raising plant, coal conveyor, boiler feed pump, 2,000 kW turbo-alternator spray cooling equipment, 10-ton hand operated travelling crane, 11 kV switchgear, voltage regulator, h.t. and l.t. cable and alkaline battery driven electric tractor for municipal power station, Grahamstown. Town Clerk, Grahamstown.

PRICES OF CABLE METALS AND OTHER MATERIALS
(at Tuesday night)

	£ s. d.	New York price
COPPER, electrolytic	170 0 0	£164 0 0
Delivered in 2nd and 3rd month after order	171 10 0	—
Delivered in 4th, 5th and 6th month after order	173 0 0	—
LEAD, good soft pig (foreign)	96 0 0	96 0 0
" " " " "English" quality	97 10 0	—
Delivered in 2nd and 3rd month after order, plus	1 0 0	—
TIN (99-99.75%) (Cash)	601-602	—
" (3 months)	602½-603	—
ALUMINIUM, commercial purity (del.)	112 0 0	—
ZINC	103 10 0	96 0 0
ARMOURING:		
Galv. Steel Wire (0.104 in.)	41 10 0	—
Mild Steel Tape (0.04 in.)	26 0 0	—

CONTRACTS PLACED

Gateshead T.C. Lanterns and columns for lighting Lobley Hill and Lyndhurst estates. G.E.C. £1,459.

Metropolitan Water Board. 33 kV switchgear, control gear with protective systems and remote control, metering and supervising, equipment for transformers, alternators, pumps, valves and accessories, etc., for Ashford Common pumping station. Brush Electrical Engineering Co., Ltd. £83,116.

TRADE NOTES

Change of Address.—FLUORLUX, LTD., have moved to new factory and offices, 29 Station Road, Kings Norton, Birmingham, 30, the phone number remaining Kings Norton 2885.

Indian Imports.—The Indian Ministry of Commerce has issued a list of amendments to import regulations under which electrical instruments, and apparatus not otherwise specified in the I.T.C. schedule, excluding telegraphic and telephone, and insulating boards, except vulcanised fibre, are subject to monetary ceiling, but no licences will be granted for non-essential articles, for electric irons, stoves and heaters. In addition, licences will be granted to established importers on a 40% quota basis, for the import of dry battery wax, wood separators and sealing compounds for batteries and accumulators.

Copper Price.—As from May 18 the price of electrolytic copper was increased by £2 to £164 per ton, delivered. There was a further increase of £6, making it £170 a ton, as from May 19.

As from June 1, the address of the BRITISH ASSOCIATION FOR COMMERCIAL AND INDUSTRIAL EDUCATION will be Management House, Hill Street, W.1. Telephone: Grosvenor 6231/2.

GAZETTE ANNOUNCEMENTS

COMPANIES ACTS

Brian John, Ltd., electrical accessories, etc., dealers, 17 Piccadilly, Hanley, Stoke-on-Trent. Mr. J. R. M. Jamieson, District Bank Chambers, Longton, Stoke-on-Trent, appointed liquidator at meeting on May 12.

Q. Vehicles, Ltd., electric vehicle manufacturers, Scotia Works, Low Street, Sunderland. Mr. J. H. Lundy, Midland Bank Chambers, Sunderland, appointed liquidators at meeting on May 12.

L. L. K., Ltd., electrical engineers and contractors, 27 Windmill, Bishops' Stortford, Herts. Mr. W. J. H. Wilsher, Bank House, 1-3 Churton Street, Westminster, S.W.1, appointed liquidator at shareholders' meeting on May 15.

Southern Distributors Ltd. Electrical equipment manufacturers, 75 South Street, Bishops Stortford. Liquidator appointed at members meeting on May 1, Mr. F. H. Thorpe, 75 South Street, Bishops Stortford. Creditors to send particulars of claims before June 30.

Intended Dividend

Bex Electric Ltd., Canterbury Grove, West Norwood, S.E.27. Last day for receiving proofs, May 31. Liquidator, R. J. Davis, Bedford Row House, 58 Theobalds Road, W.C.1.

Voluntary Liquidation

Frig Spares Ltd., manufacturers of and dealers in refrigerators, 7 Laurence Pountney Hill, London E.C.4. At a recent creditors' meeting a statement of affairs submitted showed liabilities amounting to £16,837, of which £10,357 was due to trade creditors; £4,935 to the bank; and £1,543 to cash creditors. Assets were estimated to realise £10,021, and after allowing £7,507 for preferential claims, there were net assets of £2,514, or a deficiency as regarded the creditors of £14,323. Issued capital of the company amounted to £3,720 and, so far as the shareholders were concerned, there was a total deficiency of £18,043.

The company was formed in April, 1944, with a nominal capital of £2,000 for the purpose of taking over an existing business. In August, 1947, the nominal capital was increased to £10,000, of which £3,720 had been issued. Trading accounts showed that for the period April 23, 1944, to December 31, 1944, the sales were £11,835 and there was a net profit earned of

£1,621. In the following two years there were net profits of £3,790 and £9,887 on sales of £27,776 and £62,090 respectively. For the year ended December 31, 1947, the sales increased to £131,429 and showed a net profit of £22,549, but for the year to December 31, 1948, there was a net loss incurred of £781 on sales of £116,938. For the 16 months to April, 1950, on sales of £56,720 there was a further net loss sustained of £14,654. The present position was partly attributed to substantially increased overheads consequent upon the removal to larger premises; intensified competition; and slump in the refrigeration trade since 1948.

A resolution passed, confirmed the voluntary liquidation of the company with Mr. M. H. Hewes, of Norfolk House, 7 Laurence Pountney Hill, London, E.C.4, as liquidator, together with a committee of inspection.

BANKRUPTCY ACTS

Hyman Gold (formerly Gelkop), electrical engineer, trading as "Radio and Electric Service," 193 Mare Street, Hackney, and "Goldway Electronics," 141 Park Road, St. John's Wood, N.W.8.

At an adjourned public examination at the London Bankruptcy Court, Carey Street, W.C., on May 17, it was disclosed that liabilities amounted to £3,424. Assets, after deducting preferential claims of £183, were expected to produce £236.

Debtor attributed his present position to the failure of R.E.S., Ltd., a concern he was financially interested in, now in liquidation; lack of capital; and heavy overhead expenses. The Registrar stated he would not adjourn the examination *sine die*, but would adjourn it generally to give the debtor just one further chance to fully disclose his affairs to the Court. If at some later date the position was not fully clarified he would then adjourn the examination *sine die*.

BUSINESS PROSPECTS

HOME

Atherstone R.D.C. Erection of 50 houses on Manchester estate. G. Carlyon May, Clerk, Council Offices, Atherstone.

Birmingham T.C. Erection of 64 dwellings under contract 124 at Ward End Hall estate and Washwood Heath Road. H. J. Manzoni, City Engineer and Surveyor, Civic Centre, Birmingham 1.

Bridgnorth T.C. Erection of 36 houses on Sydney Cottage housing estate (Woodberry Close). Borough Surveyor, College House, Bridgnorth.

Camberwell T.C. Erection of 29 dwellings on housing site No. 45 (Barry Road). Borough Engineer and Surveyor's Department (Room 11), Town Hall, Peckham Road, Camberwell, S.E.5.

Cheshire C.C. Erection of primary schools at Altrincham, Sale, Crewe, Cuddington, Weaverham, Ellesmere Port, Bebington. E. Mainwaring Parkes, County Architect, The Castle, Chester.

Darlington.—Bussey and Armstrong, Brinkburn Road, Darlington, to build four houses in Swaledale Avenue, E.C. to erect a motor engineering and general engineering workshop at Northgate domestic science centre. T.C. and Durham C.C. considering site in the Horsemarket for erection of divisional police station. T.C. has received sanction to borrow £6,287 for improved street lighting in Coniscliffe Road.

Gateshead T.C. Approved, in principle, installation of electricity in 37 houses at present served only by gas in Coulthard's Lane, Gateshead.

Gateshead T.C. Received sanction to borrow £99,905 for erection of 79 houses on Lyndhurst estate; and £36,320 for erection of 14 houses and 12 flats on Fanny Pit, Beacon Lough site. Clarke, Chapman and Co., Ltd., Victoria Works, St. James's Road, Gateshead, are considering erection of laboratory, boilerhouse, etc.

Glasgow T.C. Several works in connection with erection of 65 flats for single persons at Elliston Drive, Priesthill. W. Kerr, Town Clerk, City Chambers, Glasgow, C.2.

Hythe T.C. Erection of 22 dwellings on Sutherland Close site. M. J. H. Girling, Town Clerk, "Oaklands," Stack Street, Hythe, Kent.

Ilford T.C. Erection of additional classrooms at the Glade School, Atherton Road. Borough Engineer, Town Hall, Ilford.

Islington T.C. Tenders will be invited shortly for erection of 26 flats on Queen Margaret's Grove housing site.

L.C.C. Provision made for additional expenditure of £4,000 for electrical installation in The Royal Festival Hall. Tenders to be invited for electrical installations in ten primary and secondary schools and one special school in the third group of the fourth programme. Estimated cost £33,000. Also for a further ten schools in the fourth group. Estimated cost £32,300.

Mansfield T.C. Erection of 14 aged persons' bungalows on Birding Street site. Borough Engineer and Surveyor, Carr Bank, Mansfield.

Nantwich R.D.C. Erection of 22 houses. H. Crabtree, Engineer and Surveyor, Council Offices, Stapley House, Stapley, Nantwich.

Newtown and Llanllwchaiarn U.D.C. Erection of 38 houses on site "B," Plantation Lane. J. Brian Cooper, Architect, 177 Corporation Street, Birmingham 4.

Newcastle-on-Tyne. Cackett, Burns, Dick and McKellar, 21 Ellison Place, Newcastle-on-Tyne have prepared plans for alterations in Barrack Road for Taylor Dunford and Co., Ltd., and conversion of premises in Wentworth Place into four flats and A. Reid and Co., Ltd. C.W.S. Architects' Dept., 90, Westmorland Road, Newcastle-on-Tyne, prepared plans for warehouse, etc., in Scrogg Road and Highfield Place for the Walker Co-op. Society. City Architect, 18 Cloth Market, Newcastle, has prepared plans for converting No. 14 Great North Road into three flats for the City Housing Committee. Plans have been prepared by the City Architect for a dental surgery for Education Committee at Byker Hill East End Health Centre.

Northumberland. C.C. considering erection of new fire stations at Alnwick and Newburn. To spend £2,200 on provision of dining-room facilities at Thomas Taylor Homes, Stannington. First instalment of the C.C.'s plan for a new technical college at Ashington will cost £150,000 and will include the erection of the main building, erection of

workshops and site works. Total cost of the college will be about £400,000.

Northumberland C.C. Approved £6,000 scheme for providing a canteen at County Hall, Newcastle-on-Tyne. County Architect, County Hall, Newcastle.

Oakham U.D.C. Erection of 18 houses on site of Burley Road. F. J. Lenton and Partners, 16 Broad Street, Stamford.

Scarborough. T.C. Received M.H. sanction to borrow £3,500 for extending the Corporation's catering department in Dean Road, and £1,974 for converting premises on the West Pier into public conveniences. Samuel Old Brewery (Tadcaster), Ltd., are to erect licensed premises on the Barrowcliff Estate.

Sevenoaks R.D.C. Erection of eight two-bedroom and ten three bedroom houses on Coles Lane Site, Brasted. Engineer and Surveyor, "Inglewood," Oak Hill Road, Sevenoaks.

Sheffield T.C. Erection of a technical secondary school, Jordanthorpe, Sheffield. Estimated cost exceeds £200,000.

Smethwick T.C. Erection of 36 dwellings at Newlands Green. Borough Engineer and Surveyor, R. Fletcher, Council House, Smethwick.

South Shields T.C. Erection of 60 dwellings at Simonside. Borough Engineer, Town Hall, South Shields.

Tintwistle R.D.C. Erection of 20 houses in West Drive, Tintwistle. M. Osbaldeston, Clerk to the Council, Knarvside, Tintwistle, Hadfield.

Tynemouth E.C. Erection of new county primary infants' school at Marden Avenue, Cullercoats. E. E. Sharp, Chief Education Officer, South Preston Villa, N. Shields.

NEW COMPANIES

Extracted from the Register issued by Jordan and Sons, Ltd., 116 Chancery Lane, London W.C.2.

E. and J. Pogson, Ltd. Electrical wiring contractors for public and private buildings, etc. Cap.: £1,000. Dirs.: F. Pogson, Park View, Lingards Wood, Marsden, E. Pogson, Mrs. E. Pogson and J. Pogson.

K. Norton Scott and Co. Ltd., 234/248 Fields New Rd., Chadderton, Lancs. To acquire the assets of the business of designers and manufacturers of gas and electrical infra-red ovens, heaters, conveyors and textile drying oven equipments and electrical engineers carried on at Chadderton as "The Infra-Red Manufacturing Co.," and to acquire from K. N. Scott premises known as 234/248 Fields New Rd., Chadderton, together with certain tools and other loose equipment, etc. Cap.: £5,000. Dirs.: K. N. Scott and T. L. Rawson.

Macklin and Gee Ltd. Mechanical, motor, electrical, oil fuel and general engineers, etc. Cap.: £500. Subs.: E. S. Spearing, 48 Eastry Rd., Erith, Kent. and S. H. Plater.

Mech-El Precision Co., Ltd., 4 Rodborough Mews, W.9, Electrical, mechanical and general engineers, etc. Cap.: £500. Dirs.: V. Finka, V. Kano.

OVERSEAS

Australia Overseas Corporation (Australia) Ltd., of 375 Collins Street, Melbourne, Victoria, are interested in obtaining U.K. agencies for clocks and watches, electrical appliances and insulated wires and cables. Their representative in London, Mr. W. H. McCorkell, can be contacted c/o George Lormer, Palmerston House, 51 Bishopsgate, E.C.2.

Bharat, Crucible House, Bakri Pule, Ahmedabad, wish to contact manufacturers of high temperature electric furnaces and crucible moulding presses.

Jaypee (India) Agencies, Post Box No. 124, New Delhi, wish to contact manufacturers and suppliers of electric machines and implements, small generating sets, and small tools and machinery.

TRADE MARKS

This information is extracted from the Official Journal by permission of the Controller.

Air Marshall. 686,032. Class 9. Radio and television sets. Price and Co. (Manchester) Ltd., 50 Spear Street, Oldham Street, Manchester 1.

Elm. 679,776. Class 9. Electric switchgear, fitted switchboards and relays. Milne and Longbottom Ltd., Elm Works, Mere Lane, Rochdale.

Lammix. 685,573. Class 7. Culinary mixing and mincing machines. Huwood Components Ltd., Glasshouse Street, St. Peters, Newcastle-on-Tyne 6.

Mancuna in diamond. 685,881. Class 11. Mancuna Eng. Ltd., Mancuna Works, Lyon Street, Manchester 10.

Memcol. 676,841 Class 9. Electrical apparatus, instruments and wireless sets. 676,942. Class 11. Apparatus for lighting, heating, cooking, refrigerating, drying and ventilating. Midland Electric Mfg. Co. Ltd., M.E.M. Works, Reddings Lane, Tyseley, Birmingham 11.

Peter Pan. 686,657. Class 11. Lampshades. A. L. MacLeod, 13 Duke Street, St. James's, London, S.W.1.

Pixytone. 686,604. Class 9. Radio sets. Ingleburn Products Ltd., 40 High Street, Malmesbury, Wilts.

Sumacon. 685,956. Class 11. Refrigerating and cooling installations and apparatus. Consumer Packs Ltd., Dairycoates, Hull.

Spinney. 685,105. Class 7. Cleaning, drying, hairdressing, mangling, mincing, mixing, polishing, knitting, sewing, washing and wringing machines, etc. Littlewoods Mail Order Stores, Ltd., Waterloo Buildings, Cases Street, Liverpool 1.

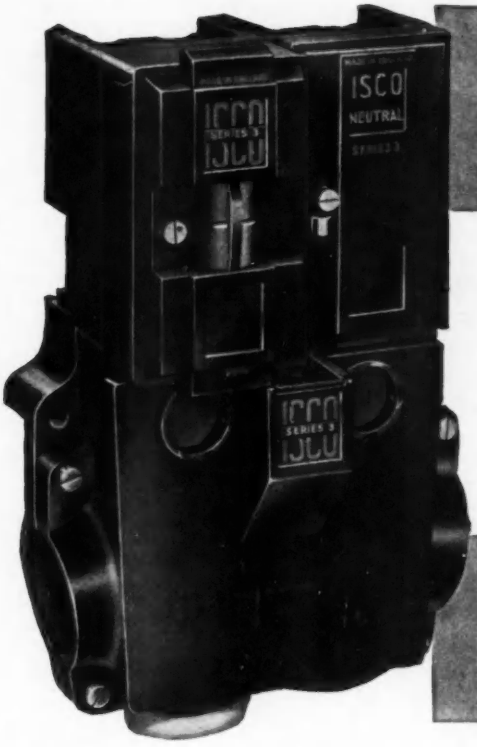
Whirlmatic. 685,478. Class 11. Installations for cooling and pasteurising milk and for storing milk under refrigerated or cold conditions. Essex Refrigeration Co., Ltd., 5-7 Tudor Parade, Chadwell Heath, Essex.

Waygood Otis with design. 670,433. Class 7. Lifts, hoists, moving stairways, endless conveyors, electric motors (not for land vehicles), electric generators, etc. Waygood-Otis Ltd., Falmouth Road, London S.E.1.

MEETING TO NOTE

THURSDAY, MAY 25

I.E.E. (annual general meeting).—Institution, Savoy Place, W.C.2.—5.30 p.m.



Double-pole Insulated Service Fuse arranged for one fuse and one neutral connector with combined 4-entry sealing chamber.

Now available from stock

INSULATED SERVICE FUSES

UP TO 60 A 250 V

In the range of HENLEY Insulated Service Fuses there is an arrangement to meet your requirements. Please send us your enquiries.

The following are interesting features: —

- Double and Four-pole models with combined sealing chambers.
- Single - pole with Neutral Connector Boxes and separate 2 and 4-pole Sealing Chambers.
- Cartridge Fuse-Links to B.S.88:1947.
- For cable conductors up to .04 sq. in. or up to .06 sq. in.
- With single or double entry Terminals.
- All current carrying parts tinned.

Specialists for over fifty years

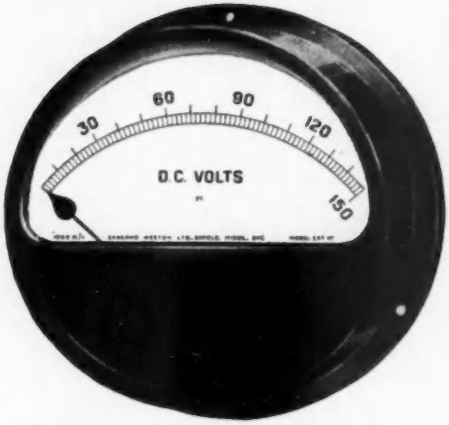
W. T. HENLEY'S TELEGRAPH WORKS CO. LTD., 51-53 HATTON GARDEN, LONDON, E.C.1

HENLEY
ELECTRICAL DISTRIBUTION EQUIPMENT

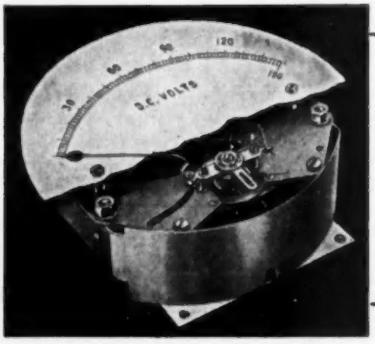
FEATURES OF WESTON SUPERIORITY

Weston

MOVING COIL SWITCHBOARD INSTRUMENTS



Combining the sensitivity of a laboratory instrument with the robust qualities of a switchboard pattern, this new series of 'Weston' permanent-magnet, moving coil instruments represents a great advance in design and technique. They incorporate thermocouples and rectifiers where necessary. Special features include efficient damping, the new standard 'Weston' patented spring-loaded jewel to protect the pivot, magnetic shielding and a high degree of accuracy. Mounted in attractive bakelite cases, flush fitting or projecting, the 6" easily read scale is printed in black on white enamel. All instruments conform to B.S.I. Spec. No. 89. Special enquiries will receive the personal attention of our Technical experts. The model S57 illustrated is supplied as a D.C. Microammeter, Milliammeter, Millivoltmeter, Ammeter and Voltmeter, all with a variety of ranges.



MAGNETIC SHIELDING. To prevent interference from external magnetic fields and to reduce those due to the instrument, it is magnetically shielded as shown. The high degree of accuracy of these instruments is in no small measure due to this 'Weston' design.

SANGAMO WESTON LIMITED

GREAT CAMBRIDGE ROAD, ENFIELD, MIDDX.
Telephone : Enfield 3434 & 1242 - - - - Telegrams : Sanwest, Enfield.
Depots at : Glasgow, Newcastle-on-Tyne, Manchester and Wolverhampton.

120

CLASSIFIED ADVERTISEMENTS

OFFICIAL TENDERS AND APPOINTMENTS

WANTED · FOR SALE WORK WANTED

Those wishing to advertise in these pages should send the text to the Classified Advertisement Dept., Electrical Times, Sardinia House, Sardinia St., W.C.2, before 10 a.m. on TUESDAY of week of issue. Official Displayed Advertisements are charged at 35s. per inch, and all other classified advertisements at 2s. 6d. per line. Situations Wanted will be published four times for twice the single insertion rate. Fee for Box No. and postage on replies is 2s.

TENDERS INVITED

HAZEL GROVE AND BRAMHALL URBAN DISTRICT COUNCIL

Trunk Road A.6. Improved Lighting Scheme

LONDON ROAD, HAZEL GROVE

TENDERS are invited for the supply and installation of the necessary steel columns, lanterns and accessories in connection with the provision of improved lighting to Group A Standard by 400 watt horizontal burning mercury vapour lighting equipment on approximately one mile of the trunk road. Contractors desiring to Tender should submit their names, accompanied by a deposit of £2 2s., which will be returned upon receipt of a bona fide Tender, to the Engineer and Surveyor, The Council House, Hazel Grove, Cheshire, not later than Monday, June 5, 1950.

The Council does not bind itself to accept the lowest or any Tender.

F. E. CAPPER,
Clerk of the Council.
(E 686)

BOROUGH OF GLOSSOP

Victoria Hall

TENDERS are invited for work at the above Hall, as follows:—

(a) Electric Lighting.
(b) Special Stage Lighting.
(c) Ventilation.

Specification and Form of Tender may be obtained on application to Geo. Faulds, Esq., M.I.Mun.E., Borough Surveyor, Municipal Buildings, Glossop.

Tenders must be on the prescribed form, and enclosed in plain sealed envelopes endorsed "Tender for Lighting, etc. Victoria Hall," and be delivered to the undersigned not later than the first post on Monday, June 19, 1950.

The Council does not bind itself to accept the lowest or any tender.

W. S. A. ROBINSON,
Town Clerk.

Municipal Buildings, Glossop.
May, 1950. (E 691)

NORTH OF SCOTLAND HYDRO-ELECTRIC BOARD

33 KV, 11 KV AND LOW VOLTAGE OVERHEAD DISTRIBUTION LINES

TENDERS are invited for the supply, delivery and erection of 32 miles of 33 kV and 58 miles of 11 kV single circuit wood pole overhead line, and 77 miles of low voltage lines between Huntley and Ballater in the County of Aberdeen.

Copies of the Tender document may be obtained on application to the Engineers, Messrs. Merz and McLellan, 39 Northumberland St., Edinburgh 3, on or after Wednesday, May 31, 1950.

Applications should be accompanied by a cheque for one guinea, which will be refunded on receipt of a bona fide Tender.

Tenders in duplicate, enclosed in a sealed cover and endorsed on the left-hand corner, "Contract AC/NC/1," must reach the subscribers not later than June 30, 1950.

The Board do not bind themselves to accept the lowest or any Tender.

W. D. D. FENTON,
Secretary.

16 Rothesay Terrace,
Edinburgh 3.
May 17, 1950. (E 695)

APPOINTMENTS VACANT

SINGAPORE MUNICIPALITY

Electricity Department

CHARGE ENGINEERS, permanent staff, required for shift duties in the Singapore Power Station. Present capacity, 37,000 kWs., with proposed extensions to 87,000 kWs.

Experience of extra h.t. 3-phase generation in a modern high-pressure steam power station is essential. Appointment subject to medical examination.

Basic salary scale, $440-$870 per month. Starting point according to qualifications and experience. Graduated scale of allowances, e.g., present allowances on $500 p.m. basic salary amount to: Expatriation, $110 p.m., plus cost of living, $180 p.m. for single man or $225 p.m. for married man, or $285 p.m. for married man with family. Annual increments $30 per month. Local taxation much lower than England. One Straits dollar equals 2s. 4d. Thus a married man with family on basic salary of $500 would draw equivalent of £1,252 sterling per annum.

Quarters, with heavy furniture provided at 8 per cent. of salary or housing allowance of 12 per cent. in lieu. Initial engagement on three years' agreement; eight months' leave after four years' service. Free medical attention. Passages paid, including family. Compulsory Provident Fund contribution, 7½ per cent. of salary and Municipal Commissioners donate 7½ per cent. for first 10 years, increasing later.

Applications in duplicate, with full personal and technical information and copies of three testimonials, to Messrs. Peirce and Williams (Agents to the Municipal Commissioners), 1 Victoria Street, London S.W.1. (E 642)

SOUTH WALES ELECTRICITY BOARD

APPLICATIONS are invited for the position of ASSISTANT ENGINEER in District 347 (Cardiff East), in the Central Sub-Area of the Board.

Preference will be given to applicants who possess an Engineering Degree of a British University, the Higher National Certificate or its equivalent, or have passed the Graduateship Examination of the Institute of Electrical Engineers.

The salary for positions will be in accordance with Class "F," Grade 4 (£767/£785/£803) of the National Joint Board Schedule for the Electricity Supply industry.

Applications stating age, present position, present salary, qualifications and experience, and whether married or single, together with the names and addresses of three referees, should be addressed to the Secretary (Establishments Section), The South Wales Electricity Board, St. Mellons, Nr. Cardiff, so as to reach him not later than June 7, 1950. (E 717)

SOUTH WALES ELECTRICITY BOARD

APPLICATIONS are invited for the position of ASSISTANT DISTRICT ENGINEER in District 348 (Cardiff West) in the Central Sub-Area of the Board.

Preference will be given to applicants who possess an Engineering Degree of a British University, the Higher National Certificate or its equivalent, or have passed the Graduateship Examination of the Institute of Electrical Engineers.

The salary for the position will be in accordance with Class "D," Grade 4 (£677/£685/£703), of the National Joint Board Schedule for the Electricity Supply Industry.

Applications stating age, present position, present salary, qualifications and experience, and whether married or single, together with the names and addresses of three referees, should be addressed to the Secretary (Establishments Section), The South Wales Electricity Board, St. Mellons, Nr. Cardiff, so as to reach him not later than June 7, 1950. (E 715)

BRITISH ELECTRICITY AUTHORITY

Eastern Division

APPLICATIONS are invited for the following appointment:—

SHIFT CHARGE ENGINEER, Brimsdown "A" Generating Station.

Salary in accordance with the revised N.J.B. Schedule, Grade 7, Class "F" (£625-£643 per annum, plus 5 per cent. London weighting).

Applicants should have served an apprenticeship and obtained an Ordinary National Certificate in Electrical and/or Mechanical Engineering or equivalent and possess experience in the operation of power stations. Experience in the operation of plant at high steam pressure will be an advantage.

The appointment will be superannuable in accordance with the British Electricity Authority and Area Boards' Superannuation Scheme.

Applications, stating age, experience, and present position, should be sent to the Divisional Controller, British Electricity Authority, Eastern Division, Northmet House, Southgate, N.14, to arrive not later than June 9, 1950. Envelopes should be endorsed "Shift Charge Engineer, Brimsdown."

W. N. C. CLINCH,
Controller.

Northmet House, Southgate, N.14. (E 689)

BRITISH ELECTRICITY AUTHORITY

East Midlands Division

ASSISTANT SHIFT CHARGE ENGINEER, AVON

APPLICATIONS are invited for the position of Assistant Shift Charge Engineer at Avon Generating Station, Warwick.

Candidates should have had a sound general and technical education, and have experience in the operation of steam power stations.

The salary will be in accordance with the revised National Joint Board Schedule, Class "E," Grade 9. The appointment will be superannuable under terms and conditions of the British Electricity Authority's superannuation scheme.

Forms of application may be obtained from the Divisional Establishments Officer at the undermentioned address, and should be returned to him not later than June 5, 1950.

W. S. BURGE,
Divisional Controller.

British Electricity House,
Barker Gate, Nottingham. (E 663)

BRITISH ELECTRICITY AUTHORITY

APPLICATIONS are invited for the following positions at the West Ham Generating Station :—

ELECTRICAL FITTER—who must have had experience in the overhaul and maintenance of heavy e.h.t. switchgear.

ELECTRICAL FITTER—for maintenance of small wiring associated with control and protection of e.h.t. systems.

MECHANICAL FITTER—for repairs and maintenance of power station instruments.

Wages and working conditions in accordance with the N.J.I.C. agreement. The present rate is 3s. 3d. per hour for a 44-hour—5-day week.

Applications, in writing, to the Station Superintendent, British Electricity Authority, London Division, West Ham Generating Station, Bidder Street, Canning Town, E.16. (E 688)

BRITISH ELECTRICITY AUTHORITY

Southern Division

APPLICATIONS are invited for the position of SECOND ASSISTANT ENGINEER on the staff of the Generation Engineer (operation) at Divisional Headquarters, Portsmouth.

The salary will be in accordance with Grade 2 of the National Joint Board schedule, namely £752-£911 per annum, according to qualifications and experience.

Applicants should have had wide experience in the maintenance of a large generating station, and be well acquainted with the operation and administration of plant in such stations.

An acquaintance with the problems arising from the operation of small steam and diesel stations will also be a recommendation.

Candidates should also have a working knowledge of the National Agreements governing the conditions of staff and manual workers, and should preferably be corporate members of a recognised professional Institution or hold equivalent qualifications.

Forms of application can be obtained from the undersigned and should be returned not later than June 9, 1950.

P. D. A. OLIVER,
Divisional Secretary.

British Electricity House,
High Street, Portsmouth. (E 711)

SOUTH EASTERN ELECTRICITY BOARD

Hastings District

DISTRICT COMMERCIAL ENGINEER

SALARY of £722 p.a. under the revised N.J.B. Schedule, Class "E," Grade 4. Superannuation will be arranged. Applications must be from qualified engineers with extensive experience in the commercial department of a large district, and be conversant with tariffs, commercial statistics, sales, installation work of all types and all aspects of service to domestic, commercial and agricultural consumers. The person appointed will be responsible for the complete control and organisation of the Department.

Applications, giving two referees, must reach J. Savage, Esq., A.M.I.E.E., Hastings Manager, South Eastern Electricity Board, 12-13 York Buildings, Hastings, by June 5, 1950.

Purley District

DISTRICT COMMERCIAL ENGINEER

Salary of £722 per annum, plus London Weighting, under the revised N.J.B. Schedule, Class "E," Grade 4. Superannuation will be arranged. Applicants should be Corporate members of the I.E.E. or hold equivalent qualifications, have practical experience in the commercial department of an electricity undertaking covering aspects of service to all classes of consumers. The District is largely residential, with rural and industrial development, and has a large installation contracting section and five showrooms. The person appointed will be responsible to the District Manager for the control and organisation of the department.

Applications, giving two referees, must reach J. McAlister, Esq., B.Sc., A.M.I.E.E., Purley Manager, South Eastern Electricity Board, Electric House, High Street, Purley, by June 5, 1950.

Eastbourne District

DEMONSTRATOR

Salary within the scale £310 p.a. by £20 to £390 under N.J.C. Agreement, Grade 1. Applicants must possess the E.A.W. Diploma, be fully experienced in demonstrating to consumers in their own homes all types of domestic electric appliances and be able to organise and conduct public lectures.

Applications, giving two referees, must reach N. Boydell, Esq., M.I.E.E., A.M.I.Mech.E., East Sussex and South West Kent Manager, South Eastern Electricity Board, Electric House, Grove Road, Eastborne, by June 5, 1950.

A. L. BURNELL,
Secretary.

May, 1950. (E 710)

YORKSHIRE ELECTRICITY BOARD

No. 5 (Wakefield) Sub-Area

APPLICATIONS are invited for the following appointment:—

THIRD ASSISTANT (STREET LIGHTING AND SPECIAL SUPPLIES)—Vacancy No. 30/50

Applicants, who should have had a good general education and be technically qualified, must be fully experienced in the application of electricity for street lighting purposes, in the preparation of estimates and in the relevant negotiations with local authorities.

They must also have had experience in negotiations for special types of supply with all classes of consumer and, in particular, with those in rural development areas.

Salary in accordance with the National Joint Board Schedule, Class "J," Grade 10, £609/£633 per annum.

Applications, stating the above vacancy number, and giving full details of age, education, training, and experience, should be forwarded to the Manager, (No. 5 Wakefield) Sub-Area, Yorkshire Electricity Board, 1a, Denby Dale Road, Wakefield, within fourteen days of the appearance of this advertisement. (E 714)

SOUTH WALES ELECTRICITY BOARD

APPLICATIONS are invited for the position of ASSISTANT DISTRICT ENGINEER in District 341 (Aberdare, Hirwaun, Mountain Ash) in the Central Sub-Area of the Board.

Preference will be given to applicants who possess an Engineering Degree of a British University, the Higher National Certificate or its equivalent or have passed the Graduateship Examination of the Institute of Electrical Engineers.

The salary for the position will be in accordance with Class "D," Grade 4 (£667 £685 £703) of the National Joint Board Schedule for the Electricity Supply Industry.

Applications stating age, present position, present salary, qualifications and experience, and whether married or single, together with the names and addresses of three referees, should be addressed to the Secretary (Establishments Section), The South Wales Electricity Board, St. Mellons, Nr. Cardiff, so as to reach him not later than June 7, 1950. (E 716)

LONDONDERRY CORPORATION ELECTRICITY DEPARTMENT

POWER STATION SUPERINTENDENT

APPLICATIONS are invited for above appointment. Salary in accordance with N.J.B. Schedule A, of November 15, 1949, Class "D," Grade 2, £810-£940 per annum. A station house, free of rent, rates and taxes, will be available.

Applicant should have sound operating and maintenance experience in a medium or large capacity generating station, and should possess good technical, practical and administrative qualifications. A superannuation scheme is in operation.

Applicant must not be over 35 years of age, except in the case of ex-Servicemen, who must not be over 40 years of age.

The successful candidate will be required to pass a medical test as to fitness, and to produce a certificate of birth, and would be required to comply with the performance of the Safeguarding of Employment Act (N.I.), 1948.

Applicant to supply the following information, also his qualifications, experience, etc., under each heading, as follows :—(1) Name and address. (2) Age; if married or single; number of children, if any. (3) If war ex-Serviceman. (4) Present position, giving class of station and grade of position. (5) Details of apprenticeship. (6) Technical training. (7) Academic distinctions. (8) Administration, up to 35 men. (9) Operation and testing of power station plant. (10) Supervision, maintenance and overhaul of turbo-alternators, W.T. boilers, ancillaries, feed water treatment plants, etc. (11) Copies of recent testimonials, or names of references. (12) Applicant to state if prepared to arrange for interview at very short notice, travelling and subsistence expenses being paid; and earliest date he could take up duties from date of receipt of appointment.

Applications marked " Power Station Superintendent," should be lodged with the undersigned not later than 10 a.m., on Monday, June 5, 1950.

Canvassing in any form will be a disqualification.

Dated this 15th day of May, 1950.

JAMES THOMPSON,
Town Clerk.

Guildhall, Londonderry. (E 687)

BRITISH ELECTRICITY AUTHORITY

Southern Division

APPLICATIONS are invited for the following vacancies on the staff of the Generation Engineer (Operation).

1. ASSISTANT TEST ENGINEER (STEAM). Applicants must be in possession of technical qualifications admitting to corporate membership of the Institution of Electrical and/or Mechanical Engineers, and/or Institute of Fuel. Candidates must have a wide practical experience in all operations associated with performance determination of large P.F., and stoker-fired boilers and/or modern steam turbines. A thorough knowledge of instrument maintenance and calibration is desirable.

2. ASSISTANT CHEMIST. Applicants should possess at least a Higher National Certificate and have a wide experience in the analysis of ferrous and non-ferrous alloys, together with metallography. Some experience of fuel analysis would be an advantage.

The salary range for both the above posts will be £579-£731 per annum. In the case of the Assistant Chemist, this is provisional only, pending final negotiations.

The appointments are superannuable and subject to a satisfactory medical examination.

Applications for forms stating for which post candidate wishes to apply, should be made to the undersigned. Completed forms must be returned by June 9, 1950.

P. D. A. OLIVER,
Divisional Secretary.

British Electricity House,
High Street, Portsmouth. (E 713)

BRITISH ELECTRICITY AUTHORITY

Southern Division

APPLICATIONS are invited for the position of ASSISTANT SHIFT CHARGE ENGINEER at Portsmouth Generating Station.

Candidates should be in possession of technical qualifications admitting to corporate membership of a recognised professional institution, have had previous experience in a large modern generating station, and preferably have had manufacturing works experience.

The conditions of service will be those approved by the National Joint Board and the salary in accordance with Class "G," Grade 9 (£571-£597).

The appointment is superannuable and subject to a satisfactory medical examination.

Forms of application may be obtained from the undersigned and must be returned by June 9, 1950.

P. D. A. OLIVER,
Divisional Secretary.

British Electricity House,
High Street, Portsmouth. (E 712)

KENT COUNTY COUNCIL

APPLICATIONS are invited for the following appointments in the Buildings Department :—

(1) SENIOR ENGINEER ASSISTANT (ELECTRICAL) in A.P.T. Grade VI (£595-£660).

(2) TWO ENGINEERING INSPECTORS in A.P.T. Grade V (£520-£570).

Applicants for (1) must be Corporate Members of the Institute of Electrical Engineers and be capable draughtsmen with good experience in the preparation of schemes, specification and estimates for all classes of electrical installation work. The duties will include the preparation of drawings, inspection of premises and supervision of installations.

Applicants for (2) must have had good practical experience in the design and installation of equipment in one or more of the following :

(a) Electrical installations for buildings.
(b) Low pressure hot water heating and domestic hot and cold water systems.
(c) Steam services associated with heating and cooking installations.

Preference will be given to Members of the Institution of Heating and Ventilating Engineers or the Institution of Electrical Engineers.

The posts are superannuable and the successful candidates will be required to pass a medical examination.

Applications, on forms obtainable from the County Architect, Springfield, Maidstone, must be delivered to him not later than fourteen days after the appearance of this advertisement.

W. L. PLATTS,
Clerk of the County Council.

County Hall, Maidstone.
May 16, 1950. (E 722)

EASTERN ELECTRICITY BOARD

Northmet Sub-Area

APPOINTMENT OF DISTRICT COMMERCIAL OFFICER FINCHLEY (Ref. No. 247)

APPLICATIONS are invited for the position of District Commercial Officer at Finchley.

The successful candidate will be responsible under the District Manager for all comercial activities.

Preference will be given to Corporate Members of the Institution of Electrical Engineers who possess the following qualifications:—

1. Sound engineering training.
2. Experience in commercial development, including rates of supply.
3. Experience in hire and hire purchase schemes, control of Service Centre sales and Maintenance Staff.
4. Preparation of wiring specifications and control of Wiring Staff.

The salary for the appointment will be on Grade 7, N.J.C. Schedule, £750-£795 per annum. Future salary and conditions of service will be in accordance with agreements made from time to time by the appropriate negotiating bodies.

Applications should be made on forms obtainable from the District Manager, Finchley District, Eastern Electricity Board, Squires Lane, Finchley, N.3, and should be returned by the 30th May, 1950.

May 20, 1950. (E 718)

EASTERN ELECTRICITY BOARD

Chilterns Sub-Area—Luton District

DISTRICT SENIOR COMMERCIAL ASSISTANT (INDUSTRIAL POWER)

APPLICATIONS are invited for the above appointment the selected candidate being required to advise important industrial consumers on matters relating to tariffs, installation of industrial electrical equipment, factory lighting, power factor improvement, etc.

Preference will be given to those having the Higher National Certificate in Electrical Engineering, of good personality and appearance, and having considerable experience of industrial installations, including preparation of estimates for work involved.

The salary offered will be in accordance with the N.J.C. (Administrative and Clerical Grade) Provincial Scale, Grade 4, £530 per annum. The selected candidate will be required to contribute to a superannuation scheme and may be required to undergo a medical examination.

Ability to drive a car is desirable.

Applications, stating age, education, technical qualifications and experience should be submitted in writing, to: The District Manager, Luton District, Chilterns Sub-Area, Eastern Electricity Board, 487 Dunstable Road, Luton, Beds., to arrive not later than fourteen days from the appearance of this advertisement.

May 19, 1950. (E 719)

BOX No. replies to be addressed to the ELECTRICAL TIMES, Sardinia House, Sardinia Street, London W.C.2

BRITISH ELECTRICITY AUTHORITY

Eastern Division

APPLICATIONS are invited for the following positions in the Generation Construction Department at Divisional Headquarters in North London:—

(a) GRADE 1 DRAUGHTSMAN (ELECTRICAL)

The commencing salary will be within the range of £494-£600 per annum, plus 5 per cent. London weighting, depending upon experience and qualifications.

(b) GRADE 2 DRAUGHTSMAN (ELECTRICAL)

The commencing salary will be within the range of £347-£461 per annum, plus 5 per cent. London weighting, depending upon experience and qualifications.

Applicants for position (a) should possess the Higher National Certificate, and for position (b) the Ordinary National Certificate in Electrical Engineering and have a knowledge of the layout of electrical power plant, e.h.t. sub-stations, and the preparation of transmission and works power systems.

The salaries are provisional and will be subject to negotiation through the medium of the appropriate negotiating body.

The appointments will be superannuable in accordance with the British Electricity Authority and Area Boards' Superannuation Scheme.

Applications, stating age, experience, and present position, should be sent in envelopes endorsed with the appointment sought, to arrive not later than June 2, 1950, to the Divisional Controller, British Electricity Authority, Eastern Division, Northmet House, Southgate, N.14.

W. N. C. CLINCH
Controller.

Northmet House, Southgate, N.14. (E 645)

LONDON ELECTRICITY BOARD

METER TESTERS AND METER REPAIRERS
(MECHANICIANS)

APPLICATIONS are invited for the above positions at Lithos Road, Hampstead and Acton Lane, Willesden in the North-Western Sub-Area.

Rates of pay and conditions of service will be in accordance with the agreement of the National Joint Industrial Council for the Electricity Supply Industry, the present rate of pay being 3s. 3d. per hour, which amounts to £7 3s. per 44-hour week.

Applications stating age, qualifications and experience should be sent direct to the Establishments Officer, 46-47 New Broad Street, E.C.2, to reach his office not later than June 3, 1950. Please quote EST/V/681/T on envelope and all correspondence. (E 709)

NORTH OF SCOTLAND HYDRO-ELECTRIC BOARD

Aberdeen Area

APPLICATIONS are invited for appointment as MAINS ASSISTANT from persons having experience of change-over of system from D.C. to A.C. as applied to distribution work.

Applicants should preferably hold technical qualifications of Higher National Certificate Standard.

Salary in accordance with grade 9, class "F," of the revised National Joint Board Schedule (£538-£560 per annum).

Applications should be addressed to the undersigned not later than 10 days after the publication of this advertisement.

ALEX. GARDNER,
Area Manager.

Area Offices, Millburn Street,
Aberdeen. (E 708)

CROWN AGENTS FOR THE COLONIES

ELECTRICAL ENGINEER required in connection with the Central Electrification Scheme in Cyprus for one tour of two years with prospect of permanency. Salary according to age and experience in scale £1,050 by £50 to £1,300. Free passages and furnished quarters. Leave with pay at rate of 2½ days per completed month of residential service will be granted after the completion of tour. Candidates, between 28 and 40 years of age, must have had sound training in both electrical and mechanical engineering with experience in the practical and administrative operation of electricity supply undertaking. They should possess a competent knowledge of the operation and maintenance of 66kV systems and the erection and maintenance of high and low voltage overhead and underground a.c. transmission systems and substation plant. Preference will be given to candidates who are corporate members of the Institution of Electrical Engineers.

Apply, at once by letter, stating age, whether married or single and full particulars of qualifications and experience and mentioning this paper to the Crown Agents for the Colonies, 4 Millbank, London S.W.1, quoting M/N/25592/3B on both letter and envelope. The Crown Agents cannot undertake to acknowledge all applications and will communicate only with applicants selected for further consideration. (E 724)

CROWN AGENTS FOR THE COLONIES

ENGINEERS required by the Central Electricity Board, Federation of Malaya for three years with prospect of permanency, commencing salary according to age and experience in the scale $520 to $1,065 a month, including expatriation pay (1 Malayan dollar equals 2s. 4d.). Cost of living allowance between $150 and $375 a month according to salary and dependents. Free passages. Liberal leave on full salary. Candidates, between 24 and 35 years of age, must have had a good general education and be qualified for one of the following posts :—

(a) MECHANICAL ENGINEER. Candidates must be corporate members or Graduates of the Institution of Mechanical Engineers or possess equivalent qualifications and have had sound training in mechanical engineering, with experience in the installation and maintenance of all mechanical equipment in large modern thermal power stations. Experience in Parsons Turbines and Babcock and Wilcox Boilers a distinct advantage.

(b) ELECTRICAL ENGINEER. Candidates must be corporate members or Graduates of the Institution of Electrical Engineers or possess equivalent qualifications and have had sound training in electrical engineering, with experience in the installation and maintenance of all electrical equipment in large modern thermal power stations.

Apply, at once by letter, stating age, whether married or single and full particulars of qualifications and experience and mentioning this paper to the Crown Agents for the Colonies, 4 Millbank, London S.W.1, quoting for (a) M/N/25450/3B), for (b) M/N/25451(3B) on both letter and envelope.

The Crown Agents cannot undertake to acknowledge all applications and will communicate only with applicants selected for further consideration. (E 723)

APPLICATIONS are invited for the position of TECHNICAL DESIGN ENGINEER in the F.H.P. Motor Laboratory at a large electrical engineering Company in the West London area. Experience of F.H.P. Motor design and performance, and ability to accept full responsibility of a project from the initial design stage to factory production is essential. Applicants should possess Engineering Degree or equivalent qualifications.—Apply, giving details of age, education and job history to the Employment Officer, Hoover Limited, Perivale, Greenford, Middlesex. (E 725)

ARMATURE WINDER fully qualified and experienced, required immediately for important zinc/lead mine in Northern Rhodesia. Basic pay 36/6 per shift, plus cost of living allowance and metal bonus. Pension scheme in operation. Ideal climate with facilities for all kinds of sport.—Write, in first instance, giving full details of qualifications, experience, marital state and date available to: Box No. 536, Foster Turner and Everetts Ltd., 11 Old Jewry, London E.C.2. (E 705)

AUSTRALIA

CITY ELECTRIC LIGHT CO. LTD.

Brisbane, Queensland

This rapidly expanding public utility company with an extensive transmission and distribution system from 110 KV has vacancies for

Assistant Electrical Engineers

Good opportunities exist for suitable applicants who should be eligible for associate membership of the I.E.E. and have experience as distribution engineers. Housing guaranteed.

Commencing salary according to qualifications and experience.

Interviews may be arranged on receipt of applications in writing with personal particulars including war service, if any, and technical qualifications and experience, and accompanied by certified copies of testimonials addressed to

CITY ELECTRIC LIGHT CO. LTD.,
c/o The Agent General for Queensland,
409 The Strand, London S.W.1

(E 696p)

DRAUGHTSMEN
For South Africa

TWO DRAUGHTSMEN required for the works of Johnson and Phillips, Ltd., at Johannesburg, South Africa. The following qualifications are necessary.

Apprenticeship with a leading switchgear manufacturer, suitable technical training, at least two years' intensive drawing office experience. Senior or well experienced men preferred, but a younger man of the right calibre would be considered. Salary £600 to £780 per annum according to experience and seniority, plus statutory cost-of-living allowance (at present £57 4s. p.a.). Applications, which will be treated in strict confidence, to

Employment and Welfare Manager, Johnson & Phillips, Ltd., Charlton, S.E.7

(E 565p)

ASSISTANT ENGINEER wanted for wood pole and steel tower contracts in Northern Ireland. Salary according to experience.—Apply: J. L. Eve Construction Co. Ltd., 17 Hill Side, Ridgway, Wimbledon, S.W.19. (E 685)

ASSISTANT MANAGER required by James Scott and Co. (Electrical Engineers), Ltd., Edinburgh. Apprenticeship and subsequent experience with well-known electrical contracting firm essential. Must have experience in running of large contracts and handling of staff. Generous pension scheme. Really excellent opportunities for promotion.—Apply in confidence, stating age and experience, to A. Stuart Thomson, B.Sc., Auchraw of Mailer, Perth. (E 637)

CHIEF ESTIMATOR required by James Scott and Co. (Electrical Engineers), Ltd., Edinburgh. Previous comprehensive experience and apprenticeship with good electrical contractor essential. Excellent opportunities for advancement and promotion.—Apply in confidence stating age, experience, and any technical qualifications to A. Stuart Thomson, B.Sc., Auchraw of Mailer, Perth. (E 633)

CONTACT AND SALES REPRESENTATIVE required by James Scott and Co. (Electrical Engineers) Ltd., Glasgow, for South West Scotland. Previous sales experience essential and preference given to one with knowledge of electrical trade. Must be of good education manner and address. Specially good opportunities for young man with energy and sales initiative.—Apply, in confidence, to: A. Stuart Thomson, B.Sc., Auchraw of Mailer, Perth. (E 707)

CONTROL GEAR ENGINEER with experience of electric winders and haulages required for employment in the Midlands. Applicants with good experience of this class of work and capable of preparing schemes, should apply giving details of qualifications, experience, age, salary required and whether married or single, quoting reference 769, to: Box No. 1341, Electrical Times. (E 698)

DESIGNER/DRAUGHTSMAN required by the manufacturers of "Temco" electrical wiring accessories. Must be familiar with the light electrical apparatus industry. This post carries a good salary and offers scope for advancement for the right man.—Write, giving full details of experience, to Personnel Manager, Telephone Manufacturing Co., Ltd., Martell Road, West Dulwich, S.E.21. (E 521)

DIVISIONAL MANAGER for Yorks. and Lancs. required by leading manufacturer of electrical appliances. Applications invited from successful salesmen. Unusual opportunity to join new sales force.—Write, in confidence, giving full details of experience, career to date, age and salary required to: Box No. 1347, Electrical Times. (E 726)

ELECTRICAL ENGINEER required, capable of undertaking complete industrial power installations, including erection of shafting, drives, control gear, and motors. Permanent position offered to first-class man willing to travel.—Write, stating experience, age, and rate required.—Box No. 1335, Electrical Times. (E 690)

DRAUGHTSMEN required immediately with experience in design of structural steelwork, or platework, or pipework for steam boiler plant for priority contracts.

Apply:

John Thompson Water Tube Boilers Ltd.

Wolverhampton (E 522p)

SWITCHGEAR ESTIMATOR
For South Africa

SWITCHGEAR ESTIMATOR is required for the works of Johnson and Phillips, Ltd., at Johannesburg, South Africa.

Duties: handling inquiries and preparing estimates for locally-built and/or imported switchboards and components. Handling orders and passing instructions to works. Salary £720 per annum, plus statutory cost-of-living allowance (at present £57 4s. p.a.). Applications, which will be treated in strict confidence, to

Employment and Welfare Manager, Johnson & Phillips, Ltd., Charlton, S.E.7

(E 564p)

ELECTRICAL DRAUGHTSMEN for oil refinery work, experienced in wiring and installation layouts and taking off quantities. Should be capable of laying out small sub-stations and switch-houses. Knowledge of cable layouts and flame-proof conduit work desirable. Five-day week, with paid overtime.—Apply by letter, stating age, experience, salary expected, and when free to commence work, to Chief Draughtsman, The Lummus Co., Ltd., 525 Oxford Street, London W.1. (E 644)

ELECTRICAL ENGINEERS required for service in Middle East. Applicants should (*a*) possess Ordinary or Higher National Certificate and have had full apprenticeship with heavy electrical equipment manufacturers or with a large colliery or allied fully electrified industry, or (*b*) possess a degree and have had two years' technical apprenticeship with similar firm to above. In each case applicants must have had at least three years subsequent experience on the installation and maintenance of heavy electrical equipment. Maximum age limit 35 years. Attractive salary, plus generous allowance in local currency, free passages out and home, free medical attention, kit allowance, good leave arrangements, pension scheme.—Write, giving personal particulars and details of qualifications and experience, quoting Dept. F.191, to Box No. 2593, at 191 Gresham House, E.C.2. (E 415)

ELECTRICAL ENGINEERS, age 26 to 33 years, with qualifications of Higher National Certificate standard and experience in manufacture, repairs and maintenance of electrical plant are required as Inspecting Engineers in districts: Oxford, Worksop, Stafford, Coventry, St. Albans and Dunfermline. Progressive salary, commencing £450 rising to £650 per annum, and free pension scheme. Contributory Widows and Orphans scheme.

Apply in own handwriting, stating age, qualifications, experience and whether married or single, by letter marked "Electrical Inspector" to Chief Engineer and General Manager, The National Boiler and General Insurance Co. Ltd., St. Mary's Parsonage, Manchester 3. (E 616)

ELECTRICAL ENGINEER OR PHYSICIST, with experience of the manufacture of valves or cathode ray tubes, and with Higher National Certificate or equivalent, is required by an X-ray tube production unit for technical control work.—Apply to the Personnel Officer, G.E.C. Research Laboratories, North Wembley, Middx., stating age and record. (E 618)

ELECTRICAL INSPECTORS required by major oil company operating in Middle East. Applicants should have a wide experience of inspection and testing of motors, switchgear, and the electrical equipment associated with modern large generating stations, substations, and transmission and distribution networks with voltage range of 33 kV to 440 V. Knowledge of flameproof equipment an advantage. Possession of Higher National Certificate essential and qualifications up to A.M.I.E.E. desirable. Age limit 37 years. Attractive salary, plus generous allowance in local currency, free passages out and home, free medical attention, kit allowance, pension scheme, good leave arrangements.—Write, stating age and full details of qualifications and experience, quoting Dept. F.182, to Box 2333 at 191 Gresham House, E.C.2. (C 304)

SIMPLEX ELECTRIC COMPANY LTD.

require at their Blythe Bridge Factory a **CHIEF DRAUGHTSMAN** for the Production Drawing Office. Duties include the production design of Creda appliances, and first-class experience of appliance production methods is an essential qualification. This is a senior position for which a substantial salary will be paid.—Apply, giving details of age, experience, and qualifications, to:

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ELECTRICAL ESTIMATING AND COSTING ENGINEER required by large contracting firm in Glasgow. Successful applicant's main responsibility will be the costing and detail invoicing of transmission lines, power and lighting contracts, and time and material jobs.—Apply, stating age, salary required and giving full details of electrical experience.—Box No. 1331, Electrical Times. (E 683)

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ENGINEER wanted for sales office of electrical manufacturers near London, to handle quotations and technical correspondence. Experience of motor control gear design essential. Salary £500-£600 per annum.—State age and experience to Box No. 1289, Electrical Times. (E 578)

ENGINEER DRAUGHTSMAN with experience in design, layout and installation of complete electrical equipment for gas and chemical plants required by firm of engineers and contractors on N.E. coast.—Apply, stating age, experience and salary required to Box No. 1343, Electrical Times. (E 699)

ENGLISH Electric have further vacancies at Stafford and Liverpool for DRAUGHTSMEN to meet greatly increased switchgear programme. Men with electrical or mechanical d.o. experience on any class of electrical switch or control gear are required and every consideration will be given to draughtsmen at present on other classes of work who wish to make a career on this vitally important and interesting work.—Apply, quoting reference, 141, to Central Personnel Services, English Electric Co. Ltd., 24/30 Gillingham Street, London S.W.1. (E 706)

JUNIOR DRAUGHTSMAN required. Excellent opportunity of gaining first-class experience in an important branch of the electrical industry. West London area, A.E.S.D. London rate.—Write, full details of experience, to Box No. 1317, Electrical Times. (E 674)

OVERHEAD LINESMAN AND MATES required, Manchester and Northern Ireland.—Apply, J. L. Eve Construction Co., Ltd., 17 Hill Side, Ridgway, Wimbledon, London S.W.19. (E 631)

PRODUCTION control. SENIOR ASSISTANT required, able to control production planning, scheduling, machine shop loading, assembling, and progressing. Experience in light electrical engineering essential. Interesting work, with prospects for the right man. Five-day week. Canteen. West London district.—Write, full particulars and salary required, to Box No. 1319, Electrical Times. (E 675)

QUALIFIED ELECTRICAL ENGINEER as sales representative to take charge Midlands office of temperature control manufacturer. Some heating experience an advantage.—State age, experience and salary required, to Box No. 1287, Electrical Times. (E 577)

SALARIED REPRESENTATIVE required with established connection London accessories buyers; some contracting experience an advantage. Commission and good prospects for able man. State age, previous experience and basic salary required.—Box No. 1285, Electrical Times. (E 576)

SENIOR AND JUNIOR ELECTRICAL DESIGNERS, experienced in all classes of a.c. and d.c. dynamo electric machines from 5 to 5,000 h.p./kW. 5-day week. Superannuation scheme in operation. Applications, stating age, experience and salary expected, to Personnel Manager, Lancashire Dynamo & Crypto, Ltd., Trafford Park. (E 670)

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POWER STATION CHARGE ENGINEERS urgently required by major oil company for service in the Middle East. Must hold at least Higher National Certificate in Electrical Engineering and have had not less than three years' experience in the operation of large modern steam power stations with thorough knowledge of the routine operation of water-tube boilers, turbo-alternators, E.H.T. switchgear and auxiliary plant. Present position in this country should be not less than Grade 6a, Class "H" or Grade 8, Class "G" on N.J.B. Scale. Age not over 35 years. Married accommodation available. Commencing salary not less than £900 per annum, plus generous allowance in local currency. Free passages out and home; free medical attention, kit allowance, good leave arrangements. Pension scheme.

Write, giving age, personal particulars, and full details of qualifications and experience, quoting Dept. F.189 to

Box 2550, at 191 Gresham House, E.C.2. (E 284p)

SALES ENGINEER required for London area by Accessories Manufacturer on salary and commission basis. Knowledge of electrical installation practice an advantage State experience and basic salary required.—Box No. 1339, Electrical Times. (E 697)

SENIOR ELECTRICAL DRAUGHTSMEN are required by an established British firm with American affiliation. Experience of power distribution and lighting installations as applied to the oil refinery and chemical industry essential. Qualifications to H.N.C. standard. Substantial salaries will be paid to suitable applicants.—Write, stating age, qualifications, and experience, Foster Wheeler, Ltd., 3 Ixworth Place, London S.W.3. (E 676)

SENIOR ELECTRICAL ENGINEER, able to direct and control research, development, design and drawing office of old established light electrical manufacturers. Excellent prospects for man with first class experience.—Fullest particulars of career to date and salary required in confidence to Box No. 1303, Electrical Times. (E 614)

TECHNICAL ASSISTANT required for power cable engineering office, with experience of cable design and calculation; B.Sc. grade or equivalent. State age, salary and qualifications.—Siemens Brothers and Co., Ltd., Ref. 701, Woolwich, London S.E.18. (E 692)

TELECOMMUNICATION APPARATUS ENGINEERS. A large North London company has vacancies for apparatus design engineers. Applicants must possess a degree and experience in the development of relays, transformers, acoustic devices, etc., is desirable but not essential.—Write, stating age, experience, and salary required, to Box No. 1337, Electrical Times. (E 694)

TEST ENGINEER to take charge of test department dealing with a.c. and d.c. motors and generators, ¼-500 h.p.—Applications, with full details to Higgs Motors, Witton, Birmingham 6. (E 671)

TESTING ASSISTANT urgently required for dry core telephone cable department in modern cable factory. Must be fully conversant with test requirements for British Post Office specifications covering twin local, star quad, and multiple twin construction. Age approx. 25.—Full details of experience and salary required to Messrs. Aberdare Cables Limited, Aberdare, Glam. (E 652)

TRANSFORMER ESTIMATOR AND TECHNICAL CORRESPONDENT required. Must be capable of dealing with tenders for home and overseas business. Practical experience an advantage.—Applications, stating age, qualifications, experience, and salary required, should be addressed to Employment and Welfare Manager, Johnson and Phillips, Ltd., Charlton, London S.E.7. (E 693)

TRANSFORMER WINDER ERECTOR required for overseas factory. Must be single, a good all-round man and capable of winding, assembling and completely erecting all types of transformers from 5 kVA up to 2,500 kVA.

The successful applicant will be required to go abroad as an instructor in an existing transformer factory after a period of intensive training in the works of a firm of long standing in the London area.

Applications, by letter, giving details of age, experience and salary required, to: Box No. 1333, Electrical Times. (E 684)

YOUNG ENGINEERS wanted for Contracts and Sales Department of electrical manufacturers near London. Keen, energetic men, age approximately 25 years, required. Positions have prospects of outside sales engineering later.—State age, experience and salary required to: Box No. 1311, Electrical Times. (E 641)

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ELECTRICIAN (32), pre-war C. and G. 1st class, B. and C. certificates. Full experience a.c. and d.c. installation and maintenance, desires change to interesting and progressive position. Preferably N. London region.—Box No. 1295, Electrical Times. (E 590)

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A.C./D.C. MOTORS, STARTERS, complete change-over installations, etc.—A.A. Electrical Co., Ltd., 67 Rothschild Road, Chiswick Park, W.4. Phone: Chiswick 5105. (A 20)

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TWIN FLAT TRS. 100 yds		SINGLE V.I.R. per 100 yds	
1/044	40/6	Taped braided comp'n'd	
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Approximately:

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Saloon Cars, 8 cwt. to 10 ton G.S. Trucks (some diesel engined), Dropside trucks, Vans, Utilities, Hydraulic Tippers, Half-track Carriers, Trailers, etc., etc.

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DIESEL ALTERNATORS in stock, 1 and 3 phase, standard voltages, up to 100 kVA; details post free on request.—Thos. W. Ward, Ltd., Albion Works, Sheffield. Phone 26311 (ex 347). (E 108)

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BRAND NEW A.C. MOTORS, 1/3rd to 80 h.p. Slip Ring and Squirrel Cages, 400/440 V. 3 phase 50 c/s at 750 r.p.m., 1,000 r.p.m. and 1,500 r.p.m. With or without control gear. Immediate despatch from stock. Attractive prices. Full details post free from Thos. W. Ward Ltd., Albion Works, Sheffield. (E 110)

ELECTRIC MOTORS. 300 h.p. slipring by G.E.C. Speed, 365 r.p.m. Open type frame, R.O.B. Continuously rated. With Ellison circuit breaker and starter.

Two 150 h.p. squirrel cage by Met-Vick. Speed, 975 r.p.m. Screen-protected type, B.R.B., with drip-proof cowls. Suitable for auto transformer starting. With starter.

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The above for 400/440 V, 3-phase, 50 c/s supply.

600 h.p. slipring motor by E.C.C., for 500/3/50, 640 amp, 294 r.p.m. Open-protected type, R.O.B., mounted on bed plate. Suitable for 400/440/3/50 at outputs of 475/525 h.p. Continuously rated. With starter.

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72 h.p. synchronous motor by Harland, for 550/3/50, 78·5 amp, 600 r.p.m. Revolving field type. Pipe ventilated, B.R.B.—George Cohen, Sons and Co., Ltd., Wood Lane, London W.12 (Tel.: Shepherds Bush 2070), and Stanningley, near Leeds (Tel.: Pudsey 2241). (E 528)

FOR ELECTRIC MOTORS, GENERATORS, ALTERNATORS, SWITCHGEAR, please send your inquiries to Oldfield Engineering Co., Ltd., 96 East Ordsall Lane, Salford 5. (C 286)

QUANTITY of d.c. MOTORS 200/250 V, from ¼ to 10 h.p. Full details on application.

One PETTER 12 b.h.p. DIESEL ENGINE, "S" type, direct coupled to 36/5 amp dynamo, 220 V, 525 r.p.m., d.c., complete switchboard exhaust and necessary tanks etc., little used. Can be seen running.

One G.E.C. GENERATOR, 50 kW, 330 r.p.m., 220 V, 227 amp, oil ring bearings, switchboard complete. Can be seen running.—Box No. 1299, Electrical Times. (E 592)

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Any voltage, new, short delivery, all types of revolving electrical power.

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1 SYNCHRONOUS MOTOR, G.E.C. 9,350 h.p., 6,600 V 3-phase 50 c/s, at 500 r.p.m. Complete with 2 bearings, bedplate, exciter, reactor and panel.

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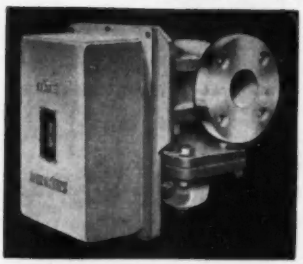

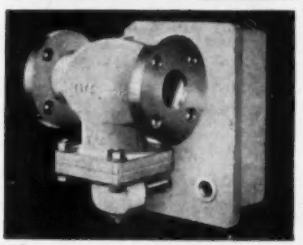

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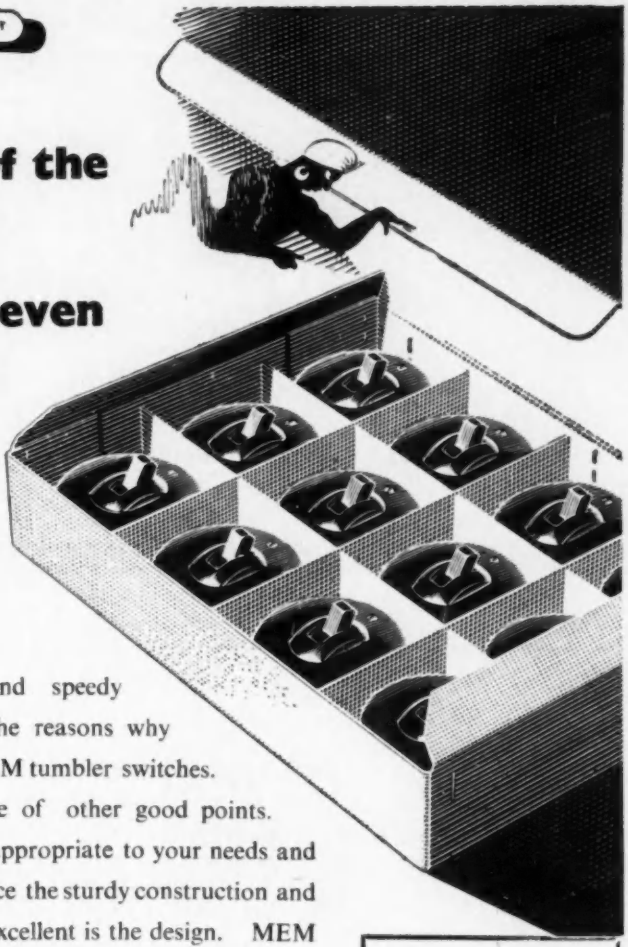

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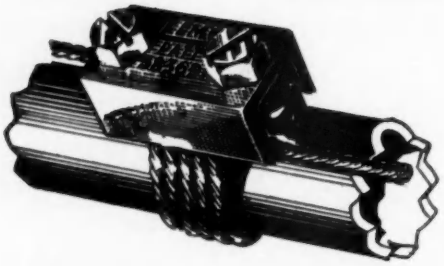

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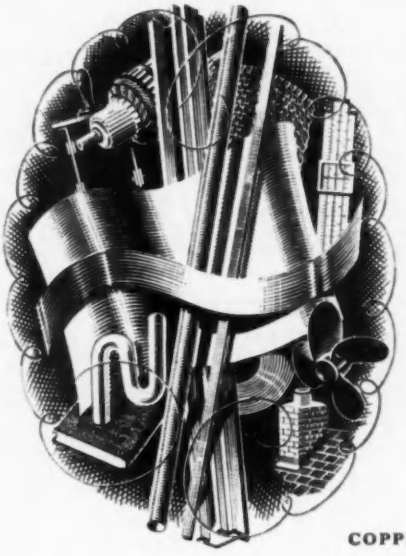

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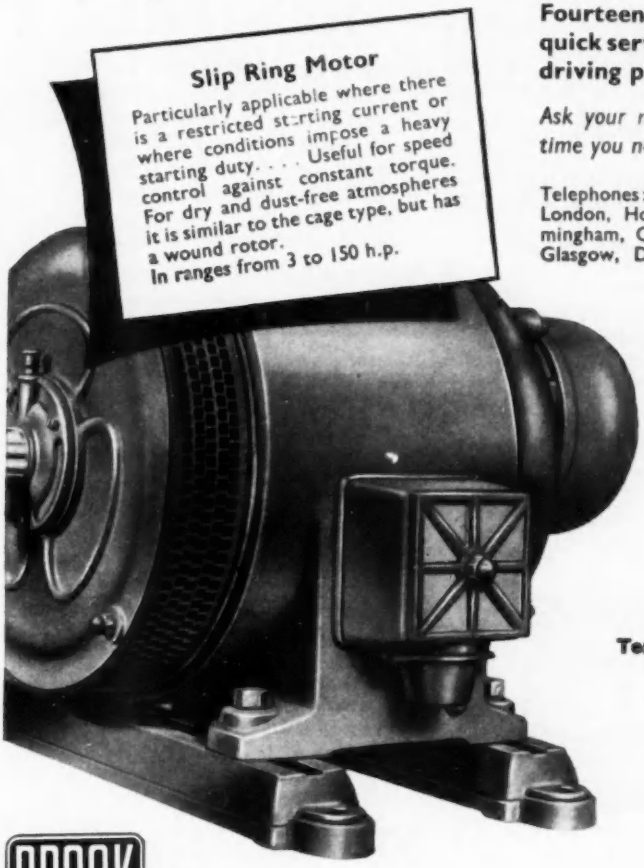

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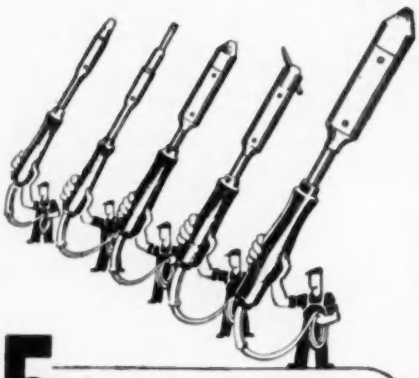

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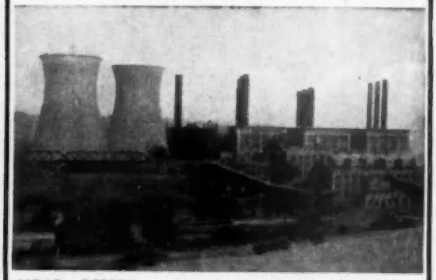

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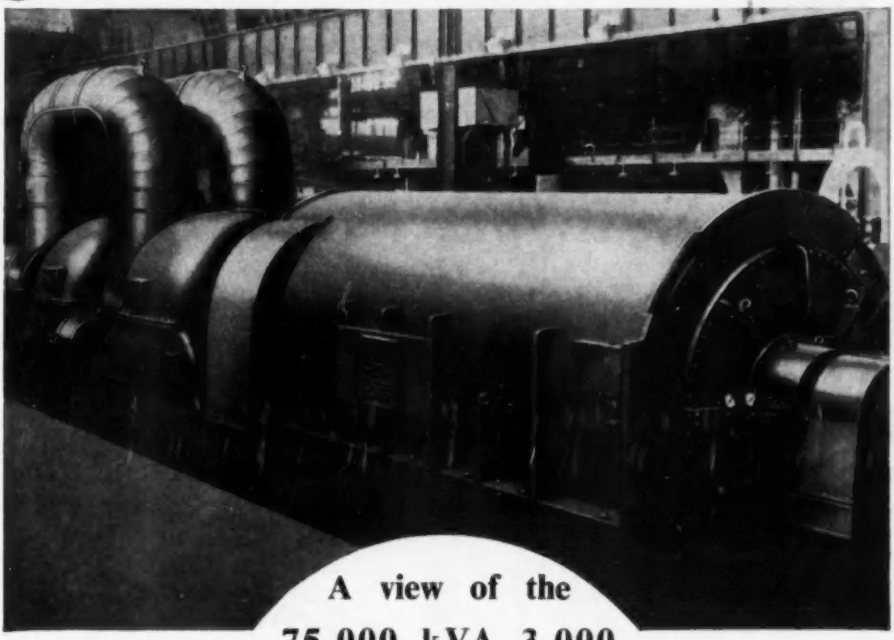

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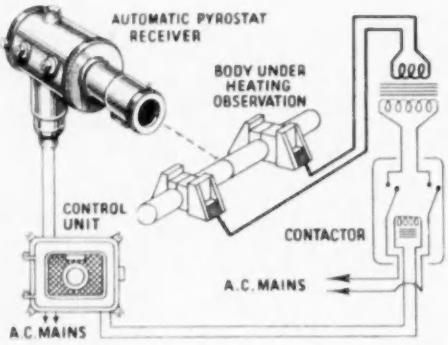

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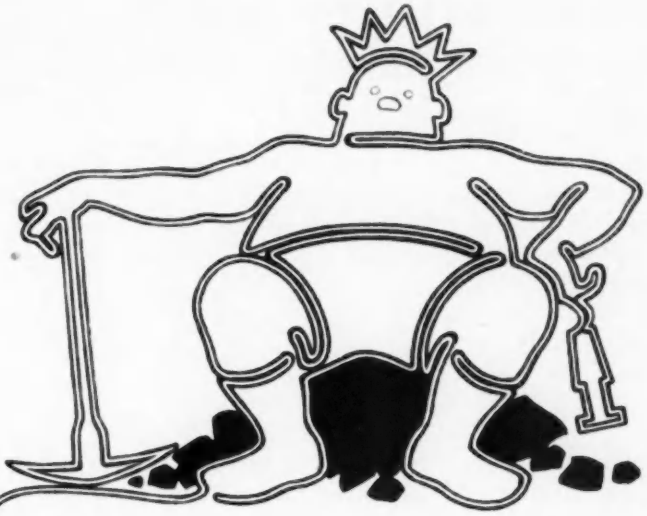

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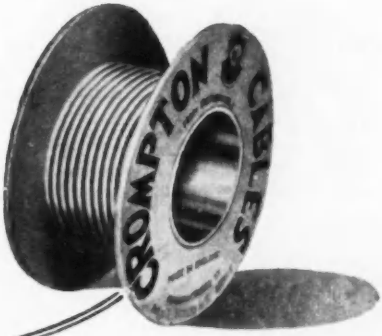

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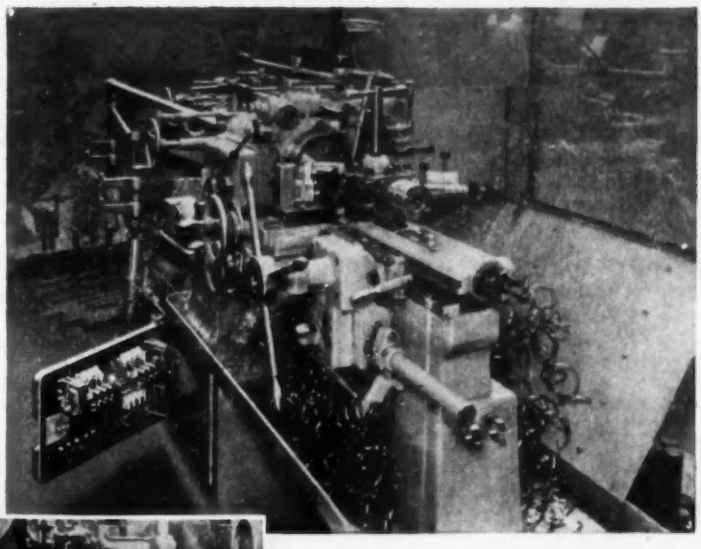

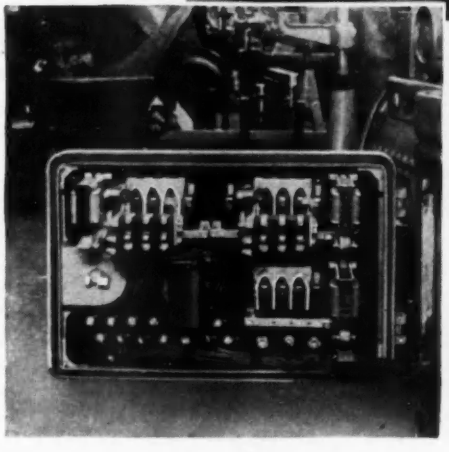

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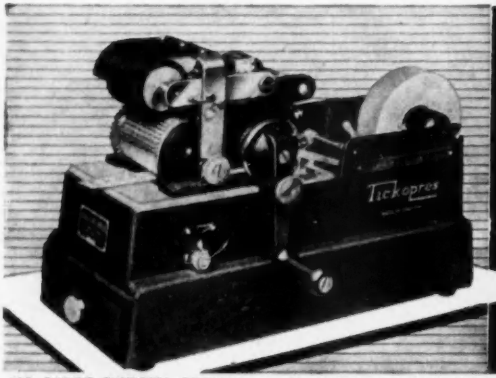

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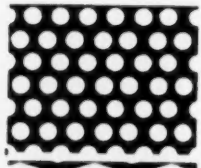

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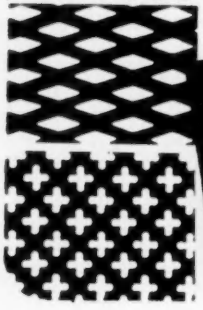

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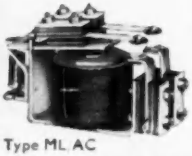

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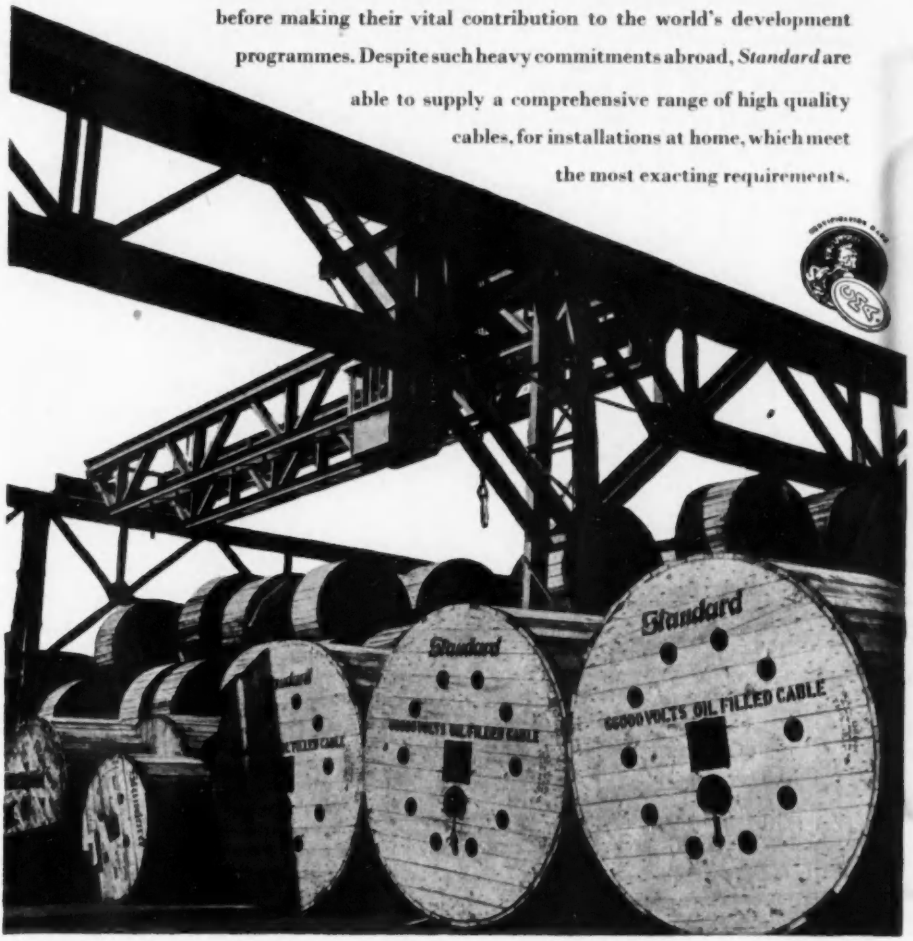

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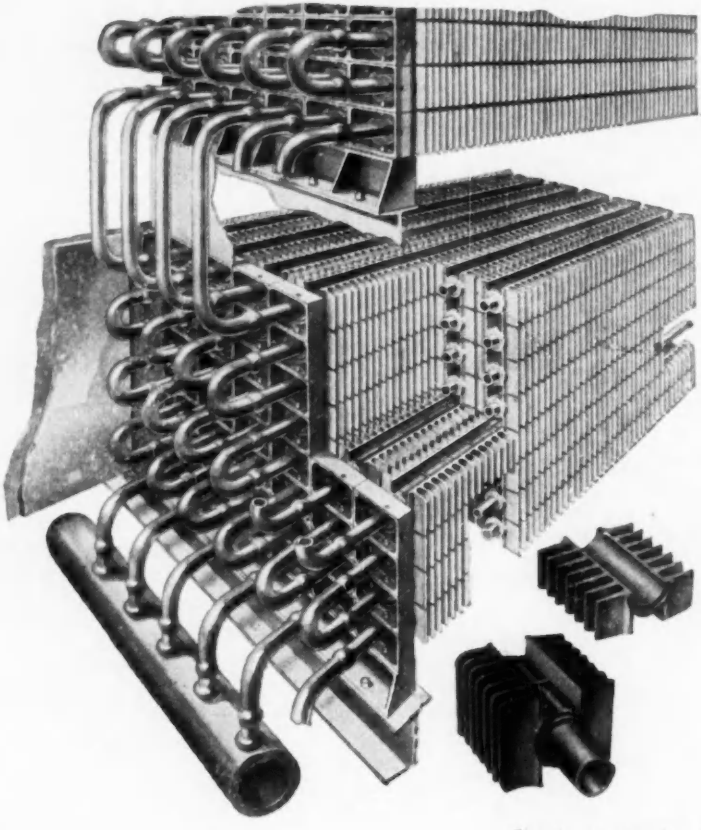

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